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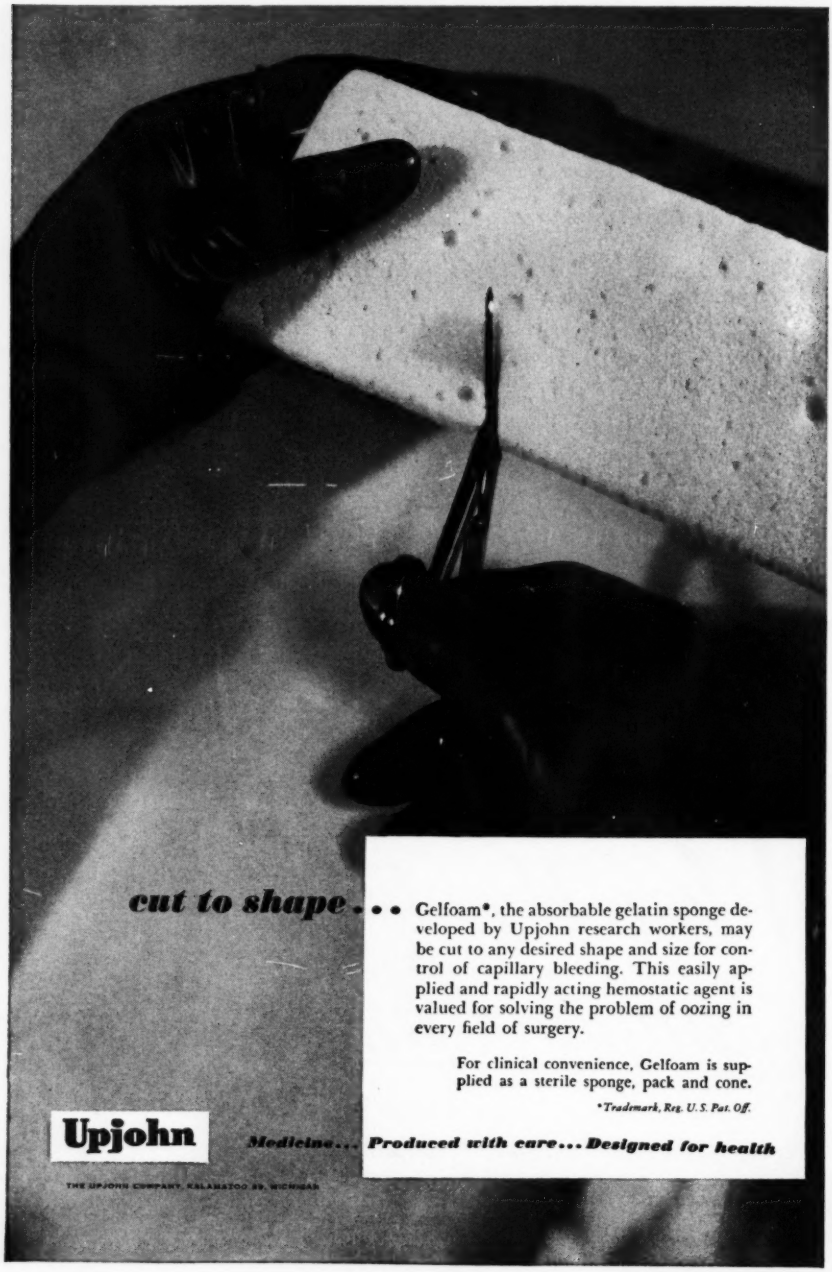
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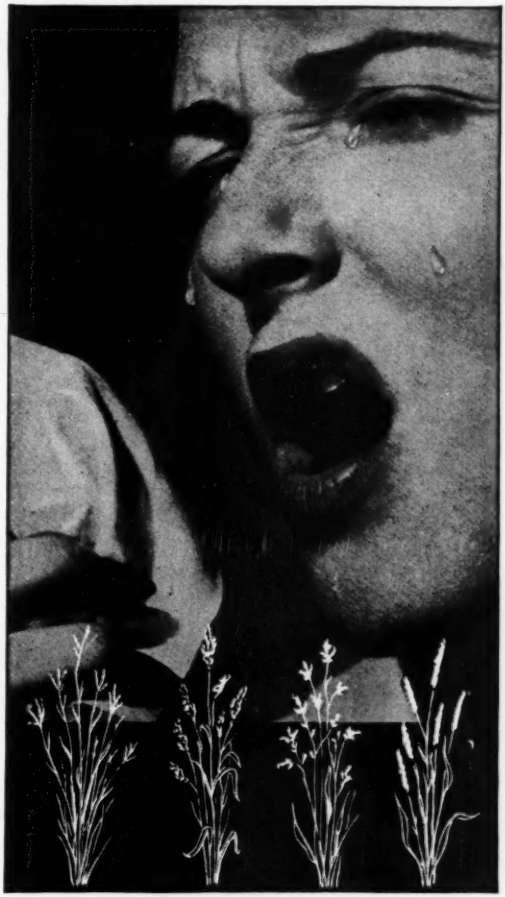

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1. Gardner, L. I., Butler, A. M., et al.: *Pediatrics* 5:228, 1950.
2. Nesbit, H. T.: *Texas State J. M.* 38:551, 1943.
3. Dodd, K., and Rapoport, S.: *Am. J. Dis. Children* 78:537, 1949.
4. Recommended Daily Dietary Allowances, Revised 1948, Food and Nutrition Board, National Research Council.

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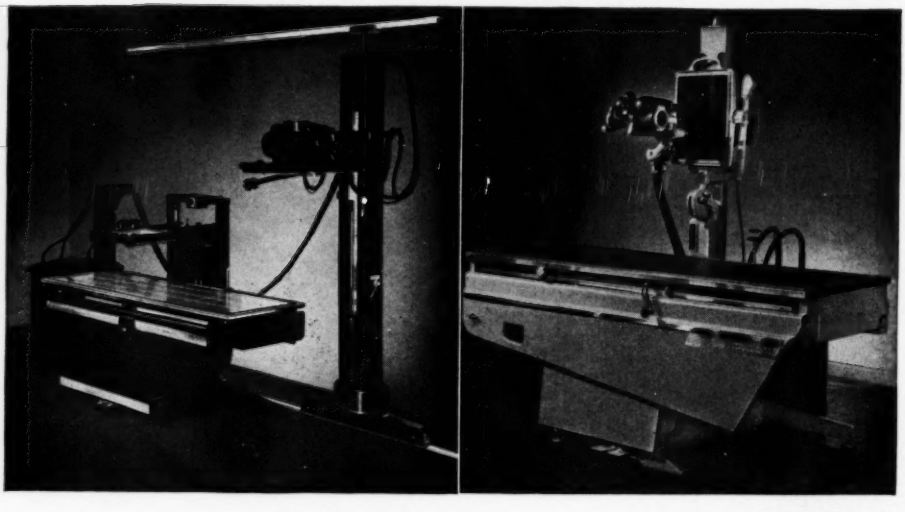

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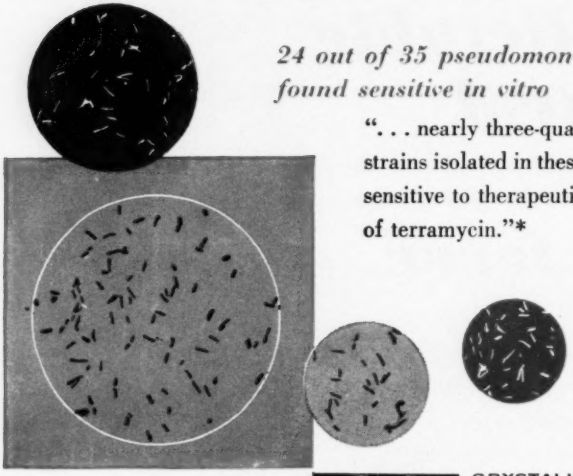

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*Lisanti, W. D., and Fletcher, S. P.: Bull. N. Y. Acad. Med. 31:150 (Nov. 25) 1955.

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1. *Fauley, G. B., Freeman, S., Ivy, A. C., Atkinson, A. J., and Wigodsky, H. S.: Arch. Int. Med. 67:653, 1941.*
2. *Upham, R., and Chaikin, N. W.: Rev. Gastroenterol. 10:287, 1943.*
3. *Collins, E. N.: J. A. M. A. 127:890, 1945.*

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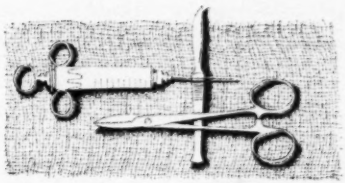

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(1) Mann, G. V., and Stare, F. J.: Nutritional Needs in Illness and Disease, J.A.M.A. *142*:409 (Feb. 11) 1950.

(2) Stieglitz, E. J.: Hypertensive Arterial Disease and Hypotension, Chapter 30, Geriatric Medicine, The Care of the Aging and the Aged, 2nd ed., Philadelphia, W. B. Saunders Company, 1949.

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THE PRESENT STATUS OF ANTIBIOTIC THERAPY*

DAVID A. COOPER, M. D.,**
Philadelphia, Pa.

The discovery and development of chemotherapeutic and antibiotic substances in the past decade represents perhaps the most dramatic period of progress in medicine. Today it is hard to realize that ten years ago there were no antibiotics while today practically all of the infections commonly encountered are amenable to treatment with chemotherapeutic agents. This field is dynamic. There are new substances being discovered and developed almost from day to day and we are gaining more knowledge of their use and limitations. There are so many antibiotic substances available today that it is at times difficult to select the proper agent and dosage for a given patient. Five years ago for practical purposes there was only one effective antibiotic, namely penicillin; today there are at least eight. These antibiotics include in the order of their discovery and use: tyrothricin, penicillin, streptomycin, bacitracin, polyyxin, aureomycin, chloramphenicol (chloromycetin), neomycin, and most recently terramycin. All of these substances have a wide range of antibacterial activity and because of this fact there has been a tendency to neglect a careful bacteriological study in most instances. This, in my opinion, has been the cause for failure in treatment in a number of patients. In any consideration of antibiotic or chemotherapy the importance of cultural demonstration of the etiologic agents and determination of its sensitivity to the various agents cannot be too strongly stressed. A recent case demonstrates this point.

The patient was a white female of thirty known to have had an old pulmonary tuberculosis that was considered arrested. She was delivered at the Lying-In Hospital on September 3rd, 1950 and was said to have had some respiratory difficulty after delivery but was apparently well enough to be discharged on her tenth day postpartum. A few days after discharge she was found to have fever and complained of pain in her chest and abdomen and was treaeted by her family physician with penicillin for five days without effect. She was admitted to the Pennsylvania Hospital ten days ago at which time she had signs of a subphrenic and pelvic abscess. Her old tuberculous lesion had apparently remained quiescent. Her penicillin was continued and streptomycin was added. It was thought that her continued fever was due to her abscesses. However, after drainage of her pelvic abscess she continued to run a spiking fever. When her cultures from her abscess were reported and sensitivity studies done, it was found that her organisms were resistant to penicillin and only slightly sensitive to streptomycin but highly sensitive to aureomycin. On switching her over to aureomycin there was a prompt febrile response. This example could be duplicated many times.

Even though these antibiotics have a wide range of antibacterial activity certain patterns of activity for the different antibiotics is well established, based not only on in vivo and in vitro experiments but based on clinical trial. For example it is quite clear that penicillin exerts its action in a most powerful way against gram positive cocci, against traponemal infections and against gonococci. It either has no effect or a very feeble effect against all gram negative bacilli. Streptomycin on the other hand has a striking effect against the tubercle bacillus and against many gram negative bacilli. Its effect against the treponemata and against gram positive micro-organisms is much less than penicillin. It is for this reason that streptomycin or dihydrostreptomycin are used almost exclusively for the treatment of

*Read before the Medical Society of Delaware, Dover, October 3, 1950.
**Associate Professor of Medicine, University of Pennsylvania.

tuberculosis and sensitive gram negative bacilli. It is a striking fact that neither penicillin or streptomycin has any effect upon the common virus infections nor upon Rickettsial infections. In the case of aureomycin and chloramphenicol the action of these drugs is different from either penicillin or streptomycin in that they have an effect on Rickettsial infections and some virus diseases as well as on bacterial diseases and amebiasis. Terramycin, the newest addition to the field has about the same range of activity against the infectious agents as aureomycin but requires a somewhat larger dosage. This substance has been in use not more than a year and therefore statements about it must be considered tentative. These latter antibiotics have considerable in common. First, their range of activity is fairly comparable. Secondly, they have good absorption from the gastro-intestinal tract which makes oral administration practical. Thirdly, they have a low degree of toxicity. Fourth, the action of these is primarily bacteriostatic in contrast to penicillin which is bactericidal.

With the discovery of each new antibiotic additional diseases are brought under control and the number of antibiotics that are effective against the common infections is increasing. This gives us more than one weapon to use against a given infection which is important because we know that some strains of organisms are resistant or develop resistance to any of the antibiotics. To fail to recognize this lack or loss of sensitivity may lead to tragic results. Whereas an appreciation of it and a change of antibiotics will lead to the control of the infection. Based on past experience we assume that certain organisms are sensitive to a specific antibiotic. We cannot be certain of this prior to actual treatment unless the organisms are actually tested for its sensitivity. This should be done whenever practical but when facilities are not available, the clinical response can be taken as the best guide to the sensitivity of the organisms involved.

The antibiotic bacitracin is produced from a strain of bacillus subtilis. It has the same general bacterial spectrum as penicillin, that is to say it is more active against gram positive organisms than against gram negative bacilli. Organisms that are resistant to penicillin may be sensitive to bacitracin. Bacitracin has been used most extensively in the treatment of mixed infections of wounds after penicillin and streptomycin have failed to bring the infection under control, when bacitracin is given by mouth amebiasis can be controlled, and it is effective in pneumonococcic and lobar pneumonia when given parenterally. However, there is considerable evidence of its nephrotoxicity, hence it is reserved mostly for local use. Polymyxin is not a pure substance but it is highly specific against gram negative bacterial infections. So far it is the most powerful agent against some strains of bacillus pyocyaneus. Most of this material has been proven to be nephrotoxic which has limited its use and value.

The indications of the antibiotics in common use today can best be presented by the following charts:

Infection	Penicillin	Streptomycin	Aureomycin	Chlor amphenicol	Terramycin
Streptococcal					
B-haemolytic	I	II	II	III	U
a-haemolytic	I	II	II	..	U
Non-haemolytic	I	..	II	..	U
All enterococci	II	..	I	..	U
Staphylococcal	II	..	I	..	III
Pneumococcal	I	III	II	..	III
Neisserian:					
N. meningitidis	I	..	II	III	U
N. gonorrhoeae	I	II	III	III	III
Diphtheritic	I	..	..	..	U
	Anti toxin				

Tuberculous	..	I P.A.S.	..	..	..
Anthrax	I	..	I	..	U
Clostridial					
Gas-gangrene	I	..	U	U	U
Tetanus	?	..	..	..	..
Gram-negative bacillary:					
Bact. coli	..	II	I	I	II
Bact. pneumonioe	..	II	I	I	II
Proteus	..	I	..	..	U
Bact. aerogenes	..	II	I	I	U
Ps. aeruginosa	..	II (Polymyxin is best)			

I—First choice III—Third choice U—Unknown
II—Second choice .. —No value

Infection	Penicillin	Streptomycin	Aureomycin	Chlor amphenicol	Terramycin
Salmonelli	..	..	..	I	..
S. typhi					
others	..	?	?	?	?
Shigella	..	..	I	I	U
Pasteurelia					
P. pestis	..	I-S.D.	U	U	U
Brucella					
Bact. tularense	..	..	I	I	U
Br. melitensis	..	II-S.D.	I	I	U
Br. suis	..	II-S.D.	I	I	U
Br. abortus	..	II-S.D.	I	I	U
Listerella	..	..	I	U	U
Cholera	..	..	U	U	U
Haemophilus					
H. influenzae meningitis	..	III-S.D.	I-S.D.	II-S.D.	U
H. pertussis	..	?	?	?	U
H. ducreyi	..	II	I	I	U

I—First choice III—Third choice S.D.—Sulphadiazine
II—Second choice .. —No value U—Unknown

Infection	Penicillin	Streptomycin	Aureomycin	Chlor amphenicol	Terramycin
Spirochaetal:					
Treponema pallidum	I	..	II	II	II
T. pertenue	I	..	U	U	U
T. carateum	I	..	U	U	U
Bacillus recurrentis	I	..	U	U	U
B. vincenti	I	..	U	U	U
Leptospira icterohoemorrhagioe	?	..	U	U	U
Donovania granulomatosis	..	II	I	I	U
Bartonella	..	..	U	I	U
Streptobacillary	..	I	U	U	U
Bacteroidosis	.	II	I	U	U

Rickettsial					
R. prowazeki	..	..	I	I	U
R. mooseri	..	..	I	I	I
R. rickettsi	..	..	I	I	U
R. conori	..	..	I	I	U
R. akari	..	..	I	I	U
R. tsutsugamushi	..	..	I	I	I
R. burneti	..	..	I	I	U

I—First choice U—Unknown
II—Second choice .. —No value

Infection	Penicillin	Streptomycin	Aureomycin	Chlor amphenicol	Terramycin
Viral:					
Psittacosis	II-S. D.	..	I	I	U
Lymphogramuloma venereum	II-S.D.	..	I	I	U
Primary atypical pneumonia	..	..	I	I	U
Herpes simplex	..	..	?	U	U
Herpes zoster	..	..	I	I	U
Chickenpox	..	..	U	U	U
Vaccinia disseminata	..	..	I	U	U
Smallpox	..	..	U	U	U
Measles	..	..	U	U	U
Mumps	..	..	..	..	U
Infectious mononucleosis	..	..	..	..	U
Epidemic hepatitis	..	..	U	U	U
Epidemic keratoconjunctivitis	..	..	?	U	U
Poliomyelitis	..	..	..	..	..
Influenza	..	..	..	..	..
The common cold	..	..	..	..	..
Parasitic:					
Acute amoebic dysentery	..	..	I	U	U
Fungal:					
Actinomycosis	I-S.D.	..	U	U	U
Trichomonas vaginalis	..	..	I I locally	U	U

I—First choice U—Unknown S.D.—Sulphadiazine
II—Second choice .. —No value

Infection	Penicillin	Streptomycin	Aureomycin	Chloramphenicol
Severe staphylococcal	I	..	I	..
Subacute bacterial endocarditis:				
a-haem. strep.	I	..	I	..
Enterococcal	I	I	I	..
Gram-negative	..	I	I	I
Staphylococcal	I	..	I	..
Acute bacterial endocarditis:				
B-haem. strep.	I	..	I	..
Pneumococcal	I	..	I	..
Meningitis:				
Pneumococcal	I	..	I	..
Staphylococcal	I	..	I	..
Gram-negative	..	I	I	I

Infection or condition	Penicillin	Streptomycin	Aureomycin	Chloramphenicol
Cholera	..	..	U	U
Gonorrhoea	I	U	U	U
Syphilis	I	..	..	..
Haem. Streptococcus	I	..	II	U
Meningococcal meningitis	I	..	U	U
Puerperal sepsis	II	..	I	U
Rheumatic fever	I	..	U	U
Subacute bacterial endocarditis	I	..	II	U
"Clean" surgery	I	..	I	U
Colonic surgery	..	I P.O.-S.S.	I	II
Pulmonary surgery	II	III	I	II
Established surgical infections	I°	II°	I°	I°
Extraction of teeth	I	U	II	U

I—First choice U—Unknown °—As indicated
II—Second choice S.S.—Sulfasuxidine .. —No value
P.O.—Per os

Dosage. Penicillin, because of its bactericidal effect remains the antibiotic of choice in its field of activity. Procaine penicillin G, 300,000 units, fortified or unfortified, with 100,000 units, of crysticillin potassium penicillin every 12 to 24 hours, intramuscularly is the preparation and method of choice and is effective in virtually all infections caused by penicillin sensitive organisms. There are, however, a few instances, particularly in endocarditis with resistant organisms, where the sodium or potassium salts, of crysticillin penicillin are preferable. Oral penicillin using sodium or potassium salt is effective in most infections but by large is not effective as parenteral use.

Streptomycin and dihydrostreptomycin will be discussed later under the therapy of tuberculosis.

Aureomycin, chloramphenicol and terramycin, all three substances have pretty much the same range of effectiveness and are given predominately by the oral route; they can be considered together. Aureomycin is used in one to four grams daily, divided into four doses, and chloromycetin and terramycin, two to six grams daily, in divided doses, varying somewhat on the severity of the infection and the presence or absence of toxic manifestations. Since these substances are bacteriostatic and not bactericidal, the period of treatment should be considered somewhat longer than in the case of penicillin.

Synergistic Effects. This entire problem of the synergistic action of two or more antibiotics is far from being settled. Experimentally it has been demonstrated that penicillin and bacitracin have a synergistic effect in rabbitt syphilis. Also it has been shown that penicillin and streptomycin have a synergistic effect against strains of enterococcus in some patients with subacute bacterial endocarditis due to enterococcus, recovery has been recorded following the use of both penicillin and streptomycin, after penicillin alone has failed. On the other hand, penicillin and chloramycetin has the opposite effect, namely, that the full action of penicillin was not demonstrated when chloromycetin was added to the culture medium. Here again it seems to me important to apply the knowledge that we gained from in vitro sensitivity studies of the infecting organisms and to this knowledge add the value of clinical trial. At this point, it seems to me a good time to mention the value of repeated sensitivity studies in chronic infections because of the change in the bacterial flora. A good example of the importance of combined therapy is the management of Brucellosis where a combination of aureomycin and streptomycin appears to be more effective than either alone. Another point in the routine use of an antibiotic such as penicillin has been brought out in a recent report on Friedlander's pneumonia by Gill, wherein he shows that the use of penicillin in Friedlander's pneumonia, may not only be useless

but harmful. In Friedlander's pneumonia there are usually secondary organisms which are sensitive to penicillin. Whereas the Friedlander organisms are resistant. By knocking out these susceptible organisms, the Friedlander organisms are more abundant and the infection more severe.

Bacterial Resistance. This most important subject should be borne in mind in the management of any and all bacterial infections. The evidence at present indicates that some strains of most bacteria can be made resistant to almost all antibiotics providing the organisms are exposed to the antibiotic long enough. It is known that gram negative bacteria develop resistance to streptomycin rapidly but to aureomycin and chloromycetin more slowly. Also organisms develop resistance to penicillin in vitro very slowly and indeed penicillin is so active against some bacteria that it is almost impossible to develop or demonstrate penicillin resistant strains of such an organism as the gonococcus. This problem of resistance is one justification for the massive doses of, particularly, penicillin that are in common use today.

Toxic Manifestations and Sensitivity. All of the antibiotics show some degree of toxic manifestations, most notable among them is the vestibular damage caused by streptomycin. Penicillin, perhaps shows the least amount of toxic reactions and sensitivity even though a wide variety of reactions to penicillin have been recorded in the literature. Most of the reactions to penicillin are of an allergic nature, some have been quite severe. I have had the unpleasant experience of seeing one that had edema of the glottis that required tracheotomy and most of us have seen varying degrees of skin reactions.

Current Status of Drug Therapy in Tuberculosis. When one considers the protean nature of tuberculosis it is not difficult to realize that no hard and fast rules for therapy can be layed down. The drugs that are most useful are streptomycin nad its derivatives, dihydrostreptomycin. The former at the present time is generally agreed to be the best drug to use routinely and the latter in exceptional instances. The usefulness of streptomycin is limited by two factors, namely, bacterial resistance and toxic manifestations. It has been clearly shown that these two factors vary with the duration of treatment and dosage and to a lesser extent with the character of the disease being treated. The next most useful drug is para aminosalicylic acid which has been shown to be bacteriostatic in vitro and in vivo. The sulfones and thiosemi-carbazones are of less value and are more toxic. The present basic plan of therapy is a combination of streptomycin and para aminosalicylic acid. That is, one gram of streptomycin given in one dose by the parenteral route daily and para-aminosalicylic acid, 12 grams daily, divided into three or four doses by mouth. The duration of therapy depended on the extent and type of disease. In the more benign type of diseases, streptomycin may be reduced to three doses per week and in the more fulminating types of disease, the dosage may be increased. In tuberculous meningitis, this combined therapy is perhaps best supplemented by intrathecal therapy with 0.050 grams every second or third day for at least 28 days. The recent trend is to prolong drug therapy, that is combined treatment for longer periods of time, that is, six months to a year and to integrate this drug therapy with collapsed and/or surgical treatment.

REFERENCE

1. Long, P. H. et al.: The Experimental Background and Clinical Use of Antibiotics: Lancet, June 24, 1950, p. 1139.

1520 Spruce Street.

DISCUSSION

DR. L. D. PHILLIPS (Marshallton): My remarks will be entirely on the tuberculosis line. We have been using streptomycin and dihydrostreptomycin at the sanitarium. At first we were giving one gram daily, and one P.A.S. (12 grams).

At the National meeting, in Washington in May, doctors from the Fitzsimmons Hospital in Denver stated they thought that one gram every third day of streptomycin was just as satisfactory as a gram daily. Since then we have been using the one gram every third day and also the 12 grams of P.A.S. daily.

We x-ray all of the patients on admission and we x-ray them before this medication is given; then they are re-evaluated at the end of every thirty days as to the future treatment. These patients generally have been given streptomycin and P.A.S. for anywhere from two to four months. We have 108 pa-

tients at the sanitarium, and of these, 48 are now getting some form of this treatment. Of all the 108, there are 76 who have had or are at present getting this form of treatment, or you might say 3 out of 4.

We found too in some of the cases after a three month period of the drug that the x-ray films in the next month or two showed more improvement than they did while the drug was being administered. Just why I don't know, but we thought there was more improvement then.

Also we think, as I believe most people think, that it is of practically no benefit in chronic fibroid cases. However, the patients do say that they feel quite a bit better when they are receiving this form of treatment. Nevertheless, the x-rays in this type of case do not indicate that such is the case.

DR. G. A. BEATTY: (Wilmington). It is always very refreshing to hear Dr. Cooper, but I have never heard him cover quite so much territory as he did today. I think the only disease that was not on his long list was leprosy.

I think the point that Dr. Cooper stressed, and we will just mention it again for emphasis, is that none of the antibiotics should be used promiscuously. If possible, sensitivity tests should not only be done at first but should be repeated, because you frequently go from one antibiotic to another during the course of any of the diseases applicable.

Also, and Dr. Phillips has already mentioned this, I would like to stress what was brought up by the Fitzsimmons group in Washington; that the new method of using streptomycin over a long period of time seems to get just as good an effect by using it every third day, with the 12 grams of P.A.S. by mouth. This is particularly important if there is any surgery contemplated in the future.

DR. EDMOND G. LAIRD: (Wilmington). I would like to ask Dr. Cooper if there is any evidence that sensitivity is built up more rapidly and more frequently by the use of these antibiotics in skin applications, such as salves, and so forth, than by the actual injection and therapeutic use intramuscularly. It seems that in surgery, people who have had these salves used them to inevitably develop more violent reaction when they use them for something more serious later on.

DR. COOPER: I would first like to thank the gentlemen for their discussion. Dr. Beatty referred to the work from Fitzsimmons General Hospital. They set up a protocol of combined interrupted treatment using streptomycin twice a week, and with the group of cases they treated they did not develop any resistant organisms.

I think that one of the answers is that since the war the type of disease they are handling at Fitzsimmons is a fresh disease picked up from the army and sent to Fitzsimmons. In other words, they are treating a different type of disease, perhaps, and certainly it is different from that which is commonly seen in most institutions.

I have had the opportunity, through the Veterans Administration, to review the cases that were presented at this meeting last spring by the Fitzsimmons group, and they were by and large fresh new tuberculosis. That, I think, is a different problem from treating the type of disease for example, Dr. Phillips has, and we have more of it in Philadelphia. That is more reason, as I see it, for cutting your suit to fit the cloth.

You have two substances: streptomycin and PAS and dependent upon the type, character, even the duration of the disease, plan your treatment and plan it in conjunction with whatever form of surgical treatment that is indicated.

In regard to the question, have antibiotics simplified the treatment of tuberculosis, the contrary is true; it is now more complex. We not only have collapse therapy and surgery but the importance of correlating and combining these various types of treatments. The antibiotics have made more cases available for surgery. The most outstanding feature in the recent trend is resection combined with antibiotic therapy. It is now more effective and safer than it was formerly.

On the matter of local application, I guess I left my text a little bit because I had this question covered, particularly of penicillin, which is the one that is in more common use. I think that you are more prone to get allergic responses after the use of local applications.

I meant to bring it out when I was talking about aerosol because I have used that over the years, and I was quite an enthusiast at one time until I got so many cases where the mouth and pharynx look like a piece of raw beef that I found that that reaction is quite common. The eye people see it quite commonly in using penicillin locally in the eyes, and I imagine the dermatologists see a good many reactions. Oral penicillin has the best record for lack of development of sensitization.

BIOLOGY OF AGEING*

EDWARD A. BORTZ, M. D.,**
Philadelphia, Pa.

The many effective remedies which the practicing physician has at his command in modern times has brought about a spectacular drop in the mortality rate of many common diseases. The medical profession today has more to offer the people whom it serves than in any previous era. Programs of annual sessions of the state medical societies offer discussions of importance to the profession for the public welfare. Refinements of diagnosis and particularly treatment are discussed. Improved concepts concerning nutrition, the diseases of the vascular system and the nervous system, the control of infections and of deficiency diseases, and the early diagnosis of cancer are presented to the busy practitioners who, in turn, apply the new knowledge and thus bring about better control of disease. The result, in terms of more people living longer, is one of the amazing accomplishments of the first half of the Twentieth Century.

THE POTENTIAL LIFE SPAN

Modern science has developed remarkably effective weapons for the control of disease. Primitive man in times B. C. had a short, active, and rather precarious existence of about eighteen years. In the heyday of Greece and the Roman Empire the life span had increased to about twenty-five years. In 1850 the average life span in the United States was approximately thirty-seven years. By 1900 it had increased to forty-nine, and in 1950 the average life span of the American woman is seventy years and the American man can look to an average life span of better than sixty-nine years. However, even in modern times the life expectancy rate of Biblical days still holds in those areas of the world where public health and the magic of modern medical science is unknown. The hinterlands of India, China, Africa, and possibly in some of the islands of the Pacific show a high infant mortality rate, and the Shamans, or tribal medical doctors, are still resorting to mystic formulae and incantations to drive out evil spirits.

Even in our enlightened nation the potentials of the life span have not been approached. If the utilization of the organs in the human body were maximum, the human life span should approximate 125 years. If the living cycle for the human body should follow the same maturation curve of evolution, development, and senescence as in the lower animals, it would seem that premature deterioration is an all too common condition today. As an example, a dog is full grown physically at two and has an average life expectancy of twelve years. At one and a half years of age a cat is full grown and has an expectancy of ten years. At four years a horse is fully grown and has a life expectancy of twenty-five years. According to this, if man is physically mature at twenty-five then he should have an averge normal life expectancy of 150 years. If this is an observation of value and represents the potentialities of natural, rhythmal existence, then man still has not nearly approached the optimum or the possible life span, since today he averages only seventy years of age.

Human life follows a definite biological pattern. Premature deterioration of the vascular system with the deposition of cholesterol in the blood vessels of the brain, the heart, the kidneys, and the muscles reduces the effectiveness of the human body and predisposes it to premature demise. However, one of the great contributions resulting from the discoveries in the field of radioactivity and atomic energy is the development of tracer technique with the use of tagged atoms placed in foodstuffs as carbohydrates, proteins, fats, vitamins, and minerals. Information of outstanding value is being uncovered. New data now accumulat-

*Read before the Medical Society of Delaware, Dover, October 4, 1950, by Dr. L. B. Flinn.

**Associate Professor of Medicine, University of Pennsylvania Graduate School of Medicine.

ed point to an effective answer to deleterious influences such as the deposition of fatty substances in blood vessel walls. This new data suggests control of hardening of the arteries, coronary occlusion, stroke, and the unfortunate results of hypertension. This kind of premature tissue deterioration should be brought under control in the not-too-distant future.

The collagen disorders, notably fibrositis, rheumatoid arthritis, rheumatic fever, and disorders of the skeletal and muscular tissues are now being intensively studied with the new methods which have made the last decade one of transcending importance. The new knowledge of nutrition offers a vigorous and healthy life for individuals at any age. Experiments wth lower anmals, as clearly demonstrated by McCay, Gardner, and others, have shown the intimate relationship between total caloric intake, quality of the diet, and length of the life span.

STAGES OF THE LIFE SPAN

Shakespeare has recorded his impressions of the seven stages of human existence. For scientific purposes it is sufficient to point out that the periods of intra-uterine development, infancy, childhood, and adolescence are pretty definitely fixed time intervals.

It is in the later years of maturity that the stresses of over-indulgences of modern living begin to exact their toll. The onset of tissue degeneration may be followed by an acceleration in the speed of body deterioration. Even so, the human life span is increasing.

In the years of early maturity and old age the disorders popularly designated as the degenerative conditions top the list in mortality tables. More than a million lives are lost each year due to premature breakdown of the vascular tissues. It does not matter much whether the certificates are labeled as "coronary occlusion," "apoplexy," "cerebral thrombosis," "hypertension," "cardiovascular disorders," or "nephritis." Control of body functions by diet, elimination of poisons, adequate rest, rehabilitation, if properly applied, may extend the mature years, the useful years of human life, with delay in the ravages of senile changes.

GERIATRICS

In the first half of the twentieth century emphasis has been placed on youth, speed, efficiency of production, hurry, the time clock. The thing to do was to be busy with an engagement-filled calendar with little thought of time for reflection. One might, perhaps, designate the worship of high-speed efficiency methods as an American neurosis. Is it not high time that an Age Movement should now be recognized, more especially since passing days are carrying all of us into the period of the later years. Geriatries now appears as a specialty in the practice of medicine which has to do with the medical disorders of elderly individuals. These, principally, are tissue degeneration of the blood vessels and the organs, weariness and body weakness, which is often the result of nutritional deficiency, and the boredom of uninteresting living conditions.

The geriatrician is coming onto the stage at a most appropriate time. There are many patients waiting for him. An accurate survey of living practices and an appraisal of physical resources is preliminary to any prescription for our elderly patients.

Prophylactic geriatries recognizes the possibilities of preventive measures which can be instituted. Control of body weight, adjustment of the diet, improvement of body elimination, the elimination of infections, the need for more rest and recreation—all these are important to the continued well-being of patients approaching the summit of the years. In this area of the human life span, the biological potentials should be kept in mind. Premature human deterioration may be brought under control and an expansion of the harvest years, the happy years, may result.

THE MAJOR INVOLUTION

The human mind, according to Aldred Scott Warthin, has always shown a definite aversion to the acceptance of old age and death as natural physiological processes. To the eyes of youth age and the aged appear foreign, almost as another race of humans on a lower scale, a race that is to be pitied and, at best, tolerated. This, as Warthin states, is a normal psychological action of the immature mind.

Problems of ageing and discussions of worthwhile objectives of human beings are intangible and likely to produce too sober a frame of mind. Thus, they are readily brushed aside; nevertheless, the problems of ageing are basically important. The premature disposi-

tion of energy invites decay; therefore, these processes are the concern of scientific medicine. They must be studied by the profession. Ways and means can be found which will add vitality and preserve the waning strength of the ageing body. Senescent processes in many instances can be guarded against.

Warthin describes the life of man as a tragic comedy in three acts—evolution, maturation, and involution. Medical science is now turning its attention to the last act, involution. The human machine transforms, stores, and releases energy. At birth the individual is given an energy charge with potential to carry it along for a variable period of time. Warthin describes the individual human body as a temporary incident in the life of the species.

In the biological human life cycle the body attains full development and then struggles for maintenance at the height of maturity until energy loss brings about decline and senescence. Senescence is a gradually developing state of organ and tissue involutions. When these are sufficiently advanced as to be clinically apparent, then age is upon us.

Different tissues of the body follow various maturation and involutional cycles. Within a single body, as shown by Cowdry, the processes of ageing act at different speeds. The coronary arteries age more rapidly than the arteries in the wrists. The ovaries become senile long before other endocrine glands involute. The life span of particular body tissues is different from that of the body as a whole. Friedenwald believes the possible life span of the human eye is 130 years if the body could last that long. Weidman points out that the skin of the trunk of an eighty-five year old furnishes the same protection as at twenty. The epidermis, the outer layer of the skin, may have a life span exceeding that of the eye.

Cowdry describes certain tissues of the body as "fountains of youth." These are found where there are reservoirs of cells that never age or die except by accident. The cells of the bone marrow are an example. These are described as intermitotics because their individual lives extend from the mitosis which produces them to the following mitosis. These cells keep dividing and some differentiate into blood cells; however, only a small percentage follow this pattern of differentiation because if all of them did, the reservoir cells would differentiate the tissue out of existence. Another "fountain of youth" tissue is in the epidermis, which continues to manufacture young cells throughout the life of the body.

There is an old saying that the human body changes completely every seven years. This might be hard to verify. However, an older body is an entirely different mechanism than that of a young adult. The changes which take place, the ageing processes, should be understood by practicing physicians in order that body energy may be conserved and living processes may be reinforced in the later periods of the life span.

Warthin maintains that senescence is a normal involutionary process which affects all of the vital organs and functions. He terms old age, a major involution, as a biological function necessary for the perpetuation of the species. When he becomes biologically useless, he is removed from the scene by the gradual fading away process of senescence. Warthin states, "The universe demands mortality for the individual if the life of the species is to attain immortality through the ability to keep up with the changes in environment of the successive ages." Warthin was thinking entirely in terms of man as an animal with total disregard for the needs of society. The extension of the human life span is producing new opportunity for the development of social equilibria. Here is a new field which needs to be explored by the geriatrician.

In striving for the preservation of human life, science is now examining the processes and influences which destroy it. It may be possible to avoid premature ageing of tissues. Life, according to Cowdry, is a succession of adjustments between the individual and his environment and also between his organs and tissues. Some of these may be easily made; others may be only partial and leave the individual handicapped by depletion of reserves. Ageing processes are hastened or modified by diseases; therefore, one way to prolong life is to protect the organisms from illness or disease. It becames a matter of avoiding com-

plications which accelerate the processes of ageing.

Certain tissue changes occur with the passage of time. Decrease in water content takes place and the individual shrinks in weight and stature. There is progressive dehydration, there is condensation of colloids. Elasticity and flexibility decrease. Wells believes this accounts for the ageing of elastic colloidal fibers in blood vessel walls.

Physiological reserves are likely to diminish with the passage of time. The decrease of adaptability is a sign of oncoming age.

GERONTOTHERAPY

Treatment of the disorders of the later years of life may be designated as gerontotherapy. As pointed out by Gardner recently in a paper before the American Chemical Society, gerontotherapy deals with the slowing down of the ageing processes and the prevention of many of the elements which are common in elderly patients.

Efficient application of known scientific methods for the control of disease will bring about a further extension of the human life span. The rich colors and qualities of interesting mature human life with the performance of work which has social significance will add to the quantity and quality of human living. Newer drugs, including the antibiotics, the vitamins, the hormones, cortisone, and ACTH are a few of the spectacular remedies now in the armamentarium of the geriatrician. The expansion of the mature years represents a major goal of science today.

2021 W. Girard Avenue.

DISCUSSION

DR. L. C. MCGEE: (Wilmington). I should like to join Dr. Flinn in regretting that Dr. Bortz, for a good reason, could not be present today. I enjoyed his paper, but we enjoy also his personality and stimulating presence.

Doctor Bortz has viewed man as a biologic unit. The life curves suggest that 21 million men and women 65 years of age and older will be living in this country by 1980. These millions will eat, sleep, wear out clothes, wreck automobiles, view television, root for the "Phillies," and, as consumers, do most of the things that men and women under 65 years of age will do. They will vote, too! It remains to be seen whether a) the care of these older citizens will be an economic burden on the back of younger workers, or (b) they will be economically self-sustaining through better utilization of their productive abilities in declining years. Ageing man may well be viewed as a sociologic and an economic unit in addition to his being a biologic unit.

Some students of cellular metabolism in ageing tissues found a hydration rather than a desiccation of tissues in old animals. (H. W. Shock, "Metabolism in Old Age," Bull. N. Y. Academy of Medicine 24: 166-178, March 1948). The water content of the cells remained unchanged, whereas the water content of aged tissues increased. It has been suggested that this increase is an extracellular edema consequent to atrophy, the loss of tissue cells, and to cardiac or renal hypofunction.

It is good to hear Doctor Bortz note the misplaced emphasis on speed and productive efficiency in the human body. The following comment has been made on modern man:

The Modern Man

"Hurry the baby as fast as you can,
Hurry him, worry him, make him a man,
Off with his baby clothes, get him in pants.
Feed him on brain foods and make him advance.

"Hustle him, soon as he's able to walk,
Into a grammar school; cram him with talk,
Fill his poor head full of figures and facts,
Keep on a-jamming them in till it cracks.

"Once boys grew up at a rational rate,
Now we develop a man while you wait.
Rush him through college; compel him to grab
Of every known subject, a dip and a dab.

"Get him in business, and after the cash,
All by the time he can grow a mustache.
Let him forget he was ever a boy,
Make gold his god and its jingle his joy.
Keep him a-hustling and clear out of breath,
Until he wins—nervous prostration and death."

DR. L. B. FLINN: (Wilmington). We have heard considerable talk the last day or two about ageing processes and rehabilitation of the elderly, but also the sick, particularly those with vascular disease. Some of us have been particularly interested in this problem with

reference to institutions such as the Gov. Bacon Health Center.

This noon some of us were given a bird's-eye view of the State Welfare Home at Smyrna. Some of the problems there with the particular patients were not new to us. I would like to suggest that more members of the Society visit that institution. It is a large tract of ground, I think about 56 acres. There are numerous buildings. There are some 380 patients with far too little bed space. They get very good care. The director of the institution must take care of its entire management. He is the sole physician, except when he calls in an occasional outside consultant.

It seemed to us a tremendous job, and we wondered at it and remarked about it. But perhaps it is a practical example of the problems we have been discussing. Dr. Prickett took that job because he retired.

DR. C. J. PRICKETT: (Smyrna). Thank you, Dr. Flinn, for those very fine remarks. I only wish I could do a whole lot more. I believe I daily think of the springs that we used to have in our bodies that we people of my age do not have any longer, and we see very very little research on elastic tissue. I would like to see some work done on that so that we might retain the springs in our bodies which we had in our youth. I know that myself and all of my patients in the welfare home would certainly be much better off, and we could accomplish much more if we could just spring along a little bit more.

In regard to Dr. Bortz' paper, Dr. Gumpert of New York recently said that he believes that rehabilitation of older people depends almost entirely upon how much we can preserve and how much we can reactivate, not only in the mind and the general health but the social part of the individual's life. That means passing out a hand of hope to the fellow, being kind to him, and just making him feel that his life is still very much worthwhile, even at his greatly advanced age. Then I think finally of the statement which someone, I believe it was Ruskin, who said that if we would add years to life we must add life to years.

I want to say that any member of the Medical Society who wants to come to the Home at any time is certainly welcome. We will be glad to see them.

PRESIDENT FITCHETT: This whole problem of ageing is getting to be a more important one and a larger one every year. I am sure Dr. Prickett has had a great deal of experience with it in his work there at the Home in Smyrna.

A REVIEW OF BASIC PSYCHIATRIC PRINCIPLES*

PAUL J. POINSARD, M. D.,
Philadelphia, Pa.

This evening we will review certain basic principles of psychiatry. I have outlined four major topics which will be covered. First, is the topic of anxiety as it pertains to psychoneurosis; second, a brief review of psychosomatic conditions; third, a consideration of the obsessive personality, and finally, management of the psychoneuroses in a practice other than a Psychiatric practice.

In considering psychoneuroses, if we are to arrive at a common denominator of symptoms that is peculiar to neuroses, it is anxiety. Without anxiety, there is no neurosis. To briefly define anxiety, it is subjectively a feeling of dread, of impending disaster, and associated with this are the physiological manifestations of over-activity of the sympathetic nervous system; i. e., palpitation, perspiration, dilatation of the pupils, and so on. The way in which the individual unconsciously handles his anxiety determines to a large part the type of neurosis which he develops. If one has a concept of how anxiety is handled, one has a working framework for the understanding of the psychoneuroses.

The first and probably most common type of psychoneurosis is that of anxiety state. The person who has an anxiety state has anxiety that is free-floating so to speak. In describing his symptoms, he will say, "I have these attacks during which I feel scared to death. I don't know what I am afraid of but I feel that something terrible is going to happen." The apprehensive feeling is diffuse and is not displaced on to any object. Anxiety state—free-floating anxiety.

The next type of neurosis frequently seen is the phobic state. A few of the phobias complained of are fear of riding on a bus,

*Transcription of proceedings of the scientific staff meeting, Saint Francis Hospital, Wilmington, Delaware, February 27, 1951.

street car or elevator; fear of scissors and/or knives; fear of heart trouble; fear of cancer and fear of pregnancy. These individuals are handling anxiety by externalizing, by displacing anxiety on to some external object, person, an organ or system of the body.

The next common type of neurosis is that of obsessive neurosis or obsessive state. The patient with an obsessive neurosis is apt to give a clue to the diagnosis by saying, "I am a worrier." The doctor is apt to dismiss this significant remark by indicating that this is a universal malady. He should be aware that the patient is very often implying much more than is apparent when he says he worries. Ask him what he worries about and he may say: "Very simple things. After I leave here I will wonder whether I said the right thing to you; whether I said too much; whether I did not say enough, and so on." What is going on in that patient's psyche? He has an obsessive thought that he has indicated can be simple in content. It can be: Did I say enough? Did I say the right thing? It can be ridiculous in content such as why does the number three come after two, or a profound metaphysical premonition about the nature of life, the universe, or death. An obsession is a repetitive thought that persists in consciousness and regardless of how much force the individual may bring to bear to get rid of this annoying thought, he is very frequently unsuccessful in the attempt. You might ask him how he feels if he is successful. He will say: "I feel sort of worried, uncomfortable, butterflies in my stomach, and a tense feeling in the back of my head. Generally I feel scared and frightened." In other words, anxiety. Thus we see that the obsessive thought is present to enable the patient to relieve his anxiety.

Another type of condition seen is that of compulsion neurosis. A compulsion in the physical sphere is analagous to obsession in the mental sphere. We have seen that an obsession is a repetitive thought that persists in consciousness; whereas, a compulsion is a physical act that must be performed by the patient in order to allay anxiety. In its severe form, we are all familiar with the compulsive hand-washer. If one asks this type patient why he does not refrain from washing his hands, he is apt to say, "If I don't, I feel tense, worried, a feeling of butterflies in my stomach, with pain in the back of my head." In other words, he is anxious if he refrains from this compulsive act, whatever the compulsive act may be. That patient is allaying anxiety by means of his compulsive act.

And finally, the patient with a conversion hysteria. This conversion symptom may be in the motor, sensory, and/or visceral sphere. Anxiety is being converted into a physical symptom in one or all of the areas mentioned. True conversion symptoms are not common. It is not frequently that we see a conversion blindness, or a conversion paralysis. If one thinks of neurosis in terms of anxiety and how a particular patient unconsciously handles his anxiety one has an acceptable and understandable descriptive framework for classification and understanding of the psychoneuroses.

In considering psychomatic conditions you all know that the term psychosomatic is a word that has become quite popular in the last ten years. It is not a new word or any particular new entity that has been discovered. It is used to describe a somatic disturbance that has its origin in the psyche and implies the relationship between mind and body. The term "psychosomatic condition" is usually reserved for those conditions where a particular organ or system is involved. For example, certain cases of peptic ulcer; certain cases of colitis, and certain cases of headaches are psychosomatic. The personality make-up of patients with these conditions frequently reveal similar components on both a conscious and unconscious level. For example, the patient with colitis is often the person who feels that he has given everything and that he has received little in return. He is a grasping type, an extremely possessive individual, and yet he has no compunction about his possessiveness and his grasping. If questioned about these tendencies, he may say, "Yes, I ask a lot, I demand a lot; but after all I have given a great deal." It seems to be in the ratio of giving and receiving that his major conflict develops and expresses itself physiologically in colitis.

The person with peptic ulcer, on the other hand, from the standpoint of psychopathology, is apt to be the person who appears to the

outside world as being extremely independent; the person who is apt to say, "I don't ask for much help, but after all, I don't need any help. I am self-sufficient. I can carry on under my own steam." The unconscious need is apt to be the exact reverse. Unconsciously, the person with the peptic ulcer is frequently extremely dependent and it is felt that the gastro-intestinal system is under the influence of this psychic dependency need which influences gastro-intestinal activity apart from normal nutritional needs.

Further in the outline is the consideration of the obsessive personality. In psychoanalytical terminology, the obsessive-compulsive personality is akin to the anal personality. It was Osler who said that if you understand syphilis and all of its ramifications, all other things in medicine will come unto us. Certainly it is true in psychiatry that if we understand the obsessive-compulsive (anal personality) other things in psychiatry will come unto us.

A large percentage of patients with neuroses represent the obsessive-compulsive personality. To describe this personality, there are many adjectives. We can begin by saying that this individual is extremely exacting, meticulous, fastidious, overly-conscientious and extremely punctual. He is usually the person sitting in the office waiting for you, for he must always be on time. If he is not on time and you check his blood pressure, you will find that, in addition to having an elevated blood pressure, he is just generally upset, tense, and anxious because of his tardiness. If the obsessive-compulsive individual develops a psychosis, he will almost invariably develop schizophrenia. The schizophrenic is very frequently the patient with a decompensated obsessive-compulsive neurosis. The anal personality can go through life without developing a neurosis in the true sense. He can get along reasonably well without becoming incapacitated by the personality traits that I have mentioned. If he does develop a neurosis, it will be of the type that we considered under the heading of compulsive state or obsessive state.

When a few of these facts are available to us the understanding of the neuroses and origin of related somatic complaints becomes clear. I think all of us will agree that a patient should be considered to have an organic condition until proven otherwise. But so often we spend too much time in trying to arrive at our final diagnosis. Our orientation in medicine is such that we consider it a diagnostic disgrace to miss an organic diagnosis, but yet we can allow a person with psychoneurosis to come in and out of the office for months and if the diagnosis is missed we don't particularly feel bad about it.

We have considered what happens to the obsessive-compulsive (anal) personality if he becomes psychoneurotic and what type of neurosis that he will have. Also, it is the obsessive-compulsive personality that usually has trouble in the involutional period. The person who has an involutional depression is frequently the person who fits into the obsessive-compulsive pattern. An understanding of what existed in personality prior to the presenting symptoms certainly can be very helpful in arriving at the present diagnosis. Most cases of depression exist or occur in this type personality. Briefly, the dynamics are related to excessive standards; they have expected too much of themselves and because they were unable to measure up to their own demands depression was inevitable. If their demands were placed only on themselves perhaps their conflict would not be as great; but they are apt to impose their extremely rigid standards on other people, and, because other people do not measure up, they are disappointed in them also. Thus we see a person disappointed in himself and disappointed in people generally so that depression is inevitable. Another point about this type personality is that they are extremely refractory to the suggestion of Psychiatric treatment for several reasons. One reason is that they put moral value on their behaviour. They say, "It is right to be this way; to be any other way is wrong; — so that you are now indicating that because of the way that I am, I am sick. Well, I would much rather be sick and hold on to these things that I consider right." The Obsessive-Compulsive is refractory to the suggestion of Psychiatry and is also refractory to Psychotherapy generally.

In regards to the handling of Psychoneurosis in general practice, so often doctors do not get along well with the person who has a neurosis and they do not understand why. They will say, "I don't know how you deal with those people. How do you sit down and listen to them?" Often, the reason the practitioner does not do well with the psychoneurotic is because of the doctor's own hostility toward the patient. He is mad. He does not like to think of a human being afflicted with these difficulties. He may feel that this person is weak; that he has a weak will; that he is spineless and has no character; therefore, he is mad, and does not get along well with a person who has a neurosis. It is so important in dealing with these patients that the doctor understand his own feelings in the relationship. Why does he feel the way that he does about these patients? I doubt very much whether one can get very far in helping these people unless one can understand how one's own conflicts and one's immaturities, can enter into the therapeutic situation in such a way that it is not going to be to the benefit of the patient.

It is inadvisable to tell a patient that he has a neurosis at the time of the first examination. The diagnosis may become apparent during the initial interview, but it is not going to serve any purpose, except perhaps to set you up in his mind as being a very keen diagnostician, to tell him that he has a neurosis. You might tell him that you are not certain of the nature of his difficulties. You should have him return and at the second interview, have him talk more about himself, about what may be disturbing him, more about his relationship to his family, to his employer, and you will find that after a brief period of time, usually, not always, (because some people will never arrive at this conclusion) the patient himself will arrive at the conclusion that he does have a neurosis; not in those terms, but he begins to realize that the doctor is indicating to him that his symptoms do not have an organic basis, and by this time the doctor has established a relationship with the patient that is going to be helpful to him.

Let us consider the advisability of suggestive therapy. So often we justify some of our therapeutic procedures, not only medically but surgically as well, on the basis of their suggestive values. The value of this type of treatment is definitely limited. If you feel that a person with a neurosis should have some kind of medication, probably a sedative, it is wise to say that the medicine will help until the cause is relieved. If by giving medicine and indicating that it is the answer; if by giving an injection and indicating that it is the cure, all that one is doing is fixing that person's neurosis. And, as has been frequently said, the last state of that person is worse than the first.

I have mentioned the necessity of giving the patient an opportunity to talk. So frequently this is not done. Lack of time is very often given as an excuse for the omission. The physician is so accustomed to giving directions and advising that he often allows little time for listening. Paradoxically enough, the person with a neurosis will get more relief from what he said to the physician than from what the physician said to him. Often following a psychotherapeutic interview during which time the psychiatrist may have said little, the patient at the next visit will say, "I felt so much better after I left here the other day." Why did he feel better? He felt better for two major reasons: 1.) because of the relationship that the psychiatrist was able to establish and 2.) the therapeutic benefit of emotional catharsis associated with verbalization. The psychotherapeutic value of verbalization in the presence of a kindly and understanding attitude on the part of the physician is inestimable.

Frequently the question arises concerning the wisdom of explaining the psycho-pathology to the patient. Until he is consciously aware of these factors as a result of his own conclusion arrived at by investigation, he is not emotionally prepared to receive this information. Such technique usually creates more resistance rather than establishing helpful insight.

Finally, let us consider the preparation of the patient for psychiatric treatment. Not all people with neuroses need to consult a psychiatrist, because many of them can very effectively be treated by the physician who happens to see them first; but, in the event that

it becomes necessary that they see a psychiatrist, a certain preparation is necessary. The referring physician often says to the psychiatrist: "I have so and so who ought to come to see you, but I just can't get him to psychiatry." Why can't he? Usually because of the resistance of the doctor. If the relationship between the doctor and the patient is good, the patient will usually carry out the directions of the doctor. But if the doctor has reservations, resistances, and hostilities of his own, the patient is going to sense them, even though it isn't purposely implied, even though it isn't said. Frequently, the patient finally arrives at the psychiatrist's office under threat. Such things as: "If you don't get better I'll send you to a psychiatrist," or "Why don't you go to a psychiatrist? He won't do you any harm." If he overcomes these obstacles, the patient sees the psychiatrist once or twice and nothing at all is accomplished. If you do anticipate psychiatric treatment for a patient, prepare him properly and don't add to his resistance. The average person has already existing resistances toward seeing a psychiatrist.

We will have the pleasure of hearing from Father Thomas Reese, who is going to discuss the relationship of psychiatry and psychiatrists to religion. The priests in this diocese have been extremely interested in learning the fundamentals of psychiatry, because we know that the person with a neurosis is apt to go first to the priest, rabbi or minister and then to the doctor, or vice-versa. While religion and psychiatry are two distinct fields, the liaison of physician and minister can be often helpful in guiding the patient toward the goal of emotional maturity.

2031 Locust Street.

REV. THOMAS J. REESE*: I appreciate this opportunity of being with you and hearing Dr. Poinsard's interesting paper. The doctor's comments on anxiety and obsessions were enlightening and helpful. As a priest, I am frequently called upon to see people suffering from various kinds of anxiety and scruples. An understanding of the underlying causes of these conditions helps to prevent the development of hostility towards people suffering from them, and at times enables one to be of real assistance. Many of Dr. Poinsard's suggestions on the handling of psychoneurosis in general practice apply with equal validity to the handling of psychoneurosis by a priest, minister, or rabbi.

It is significant that a priest should be speaking at a staff meeting of medical men. It implies that there is some relationship between the subject under consideration — psychiatry —and religion. Of course, psychiatry is a specialty in the field of medicine. However, it deals with certain aspects of man that give it much in common with religion. The physician usually concentrates on organic disorders, such as a weak heart or diseased lung, and with such things religion has very little to do. The psychiatrist, however, is usually concerned with functional disorders and personal disturbances. This is closer to the field of religion, which is interested in morals, i. e., the goodness or badness of human acts. Though both are concerned with human behavior, psychiatry and religion consider it from different points of view.

The average doctor and the average clergyman have much in common in relation to psychiatry. Usually we view it with mixed feelings. We are outsiders. While we see its results and appreciate what it can do for a mentally sick person, we are vaguely suspicious of it. We probably feel equally incompetent to deal with psychoneurotics; as Dr. Poinsard suggests, we may have hostility towards the psychiatrist who does seem to be able to do something with them. Some of the suspicions of doctors and clergymen is understandable.

The doctor may be suspicious of psychiatry because of its newness. It is a late-comer in the medical field. As with every new science, its proponents have made mistakes. Further, it deals with the patient from a different point of view from that familiar to the organically orientated physician. It is understandable that a doctor might be nettled by his inability to help a patient with the usual procedures of medication or surgery. On the other hand, he is fortunate to be able to refer the psychoneurotic patient to a specialist who can really help him. While it is reasonable for a doctor to look for and treat organic ills, he should be able to make a differential diagnosis within a reasonable time so that a patient who needs

*Pastor, St. Helena's R. C. Church.

psychotherapy can get it promptly. He should not regard psychiatry as a last resort, a kind of general dumping ground for people he has not been able to help. Like the clergyman, the doctor often meets patients when they are first developing neurotic symptoms. If he is able to determine when a patient needs specialized psychiatric treatment and sends him to the psychiatrist with the proper attitude, he can perform a real service for his patient.

Many clergymen have proved to be as suspicious of psychiatry as some members of the medical profession. Again, there are some reasons for the suspicion. But the fault lies on both sides; the suspicion can be allayed, and both the psychiatrist and the clergyman can profit by mutual help.

Some of the clergy's suspicion of psychiatry has a historical explanation. Psychiatry, and especially psychoanalysis, developed in an atmosphere of materialism and anti-religious bias. Some of the pioneers in the field let their philosophy color their science and caused them to misinterpret the facts they had observed. For example, Freud's remark that religion is a universal obsessional neurosis is an expression of his personal anti-religious bias rather than a conclusion based on his scientific observation. It is understandable that such a remark would make clergymen suspicious of psychiatry and lead them to reject it wholesale, not separating the wheat from the chaff, not distinguishing between the unacceptable philosophy that sometimes intruded itself and the facts of observation and therapeutic techniques which were true and valuable. There would have been better understanding had the men of religion looked at the facts and ignored the fancies of some of the psychiatrists. On the other hand, the psychiatrists would have done a better service to their science had they stuck to facts. As psychiatry has become more truly scientific, it has become increasingly acceptable to religion.

In the past, clergymen were often hostile towards psychiatry because they feared the psychiatrist might cause spiritual harm to their patients. Psychiatrists were concerned with relieving patients of anxiety, of resolving inner conflicts. Often the patient was said to have a harsh super-ego in consequence of strict upbringing and overly great demands. It seemed at times that the psychiatrist in attempting to relieve the patient of his anxiety also relieved him of his conscience and destroyed his sense of right and wrong. Most psychiatrists today recognize that it is a disastrous short cut to try to relieve anxiety by changing the patient's standard of values and moral code; they realize that a patient has to find adjustment within the framework of his basic moral and religious convictions As psychiatry has become more patient-centered and less directive it has become less objectionable to religion.

Misunderstanding between psychiatry and religion became less frequent as the function of psychiatry was more clearly defined. Clergymen sometimes thought that the psychiatrists were trying to remake the personality of the patient and impart to him a new philosophy of life, a new set of principles and convictions. Some psychiatrists may have done this, but they were not good psychiatrists, and the clergymen had every right to protest. Fortunately, it has become increasingly clear that psychiatry's chief concern is with the unconscious or the subconscious, with behavior patterns and motivation often carried over from childhood and influencing an individual without his being aware of it. The psychiatrist is concerned primarily with unconscious forces in man. The clergyman, on the other hand, is concerned with what is conscious in man, what man recognizes himself to be responsible for.

As an illustration, contrast psychotherapy, especially psychoanalysis, with Catholic confession. In confession, a person being conscious of having committed a sin, a wrong act for which he accepts responsibility, confesses his sin to the priest for the purpose of having it forgiven. He knows he is guilty; he feels guilty. Once he has received absolution, the feeling of guilt should leave, because the sin which occasioned the feeling of guilt is gone. On the other hand, in psychotherapy one is usually dealing with a person who feels guilty and anxious, but who is not consciously aware of the source of the guilt. In the therapeutic process, the patient gradually reveals the unconscious source of the guilt. The therapist

cannot absolve him, as does the priest in confession, but he can help while the patient learns to differentiate fantasy from reality and obtains relief from feeling guilty about things of which he is not guilty at all and continues to feel guilty about the things of which he should feel guilty. The priest and the psychiatrist obviously have different functions; and it is important that each recognize the area in which he is competent. The priest frequently wastes his time in trying, by spiritual means, to relieve anxiety that has no conscious source. The psychiatrist is doing his patient a disservice if he tries to remove a sense of guilt by denial of sin.

Obviously, the priest and psychiatrist should work closely together. The priest should have sufficient psychiatric orientation to recognize a neurotic or psychotic individual and know when he probably needs psychotherapy. He can waste valuable time and do irreparable harm by trying to do what only the trained psychiatrist can do. Conversely, the psychiatrist should recognize when a patient needs spiritual guidance and direction, or a sincere confession, and send him to the priest.

More psychiatric knowledge would be helpful in clerical as well as general medical circles. It would assist the clergy in dealing more effectively with people, understanding them better, allaying hostility towards them, referring them for psychotherapy when needed, and preparing them properly to accept psychiatric help. Clergyman and psychiatrist can cooperate in helping disturbed people achieve emotional maturity.

610 Philadelphia Pike.

THE POST-PRANDIAL BLOOD SUGAR
A Probable Normal

JOSEPH L. ACKERMAN, M. D.*
and
EDWARD M. BOHAN, M. D.,**
Wilmington, Del.

In discussing the culture of the middle ages Hayes and Moon[1] noticed that there was a tendency for medieval scholars to derive their notions of science not from personal observation and experiment but from books. While this tendency is not so prevalent today, it still exists. We have been taught as medical students that the normal fasting blood sugar is 80 to 120 mg. and that there is a rise after a meal to a height quoted by various teachers and writers as 140 to 180 mg. We, as students, and later practicing physicians, have been inclined to accept this as truth because we have been taught that it was so. In the proceedings of the American Diabetic Association[2] in 1948, it was resolved that "upon recommendation of an advisory committee of physicians, a consistent one hour post prandial venous blood sugar of 170 mg. per cent or above plus glycosuria were considered to be indicative of diabetes." In the same proceedings Blotner[3] cites three cases in which the blood sugar was 120 mg. or below fasting and the two hour glucose tolerance curve showed values of over 200 mg. with glycosuria, except in one case in which the blood sugar was 220 mg. one and one half hours after glucose and the urine still negative for sugar. However, in this case the urine became 3+ at the one hour level. He concludes "if one blood sugar analysis is to be made, I think it is best to determine it in one half or one hour after a high carbohydrate meal." The most interesting observation here is the finding of the negative urine with a blood sugar of 220 mg. This has been noticed in other cases at the diabetic clinic at St. Francis Hospital, and this finding has also been emphasized by Sindoni[4] at the Philadelphia General Hospital, who thinks there is undoubtedly a variation in the renal threshold in many cases of diabetes.

John[5] says that in the normal person following each meal there is a rise in the blood sugar level. "This rise is not very high and does not last long, from one to two hours at most, usually one and one-quarter to one and one-half hours. Thus we speak of a normal, physiologic, post prandial hyperglycemia." He thinks that during twenty-five per cent of the twenty four hours we can consider an allowable period of hyperglycemia in the average person. But an elevation to 126 or 136 mg. is not considered normal by him at this two and one-half hour period post prandially, and a glucose tolerance test is justified. While the statement of John is more in accordance with modern thinking, he does state that a normal hyperglycemia occurs at the one and

*E. I. du Pont de Nemours Company, Medical Division, Wilmington.
**St. Francis Hospital, Department of Metabolism.

one-half hour period after meals. Other writers such as Kolmer[6] and Yater[7] in separate communications consider hyperglycemia to occur normally after a meal. Kolmer in 1943 says that hyperglycemia occurs normally after a meal, especially after the ingestion of carbohydrates and he believes that blood sugar determinations should be made after a period of at least five hours of fasting, or preferably in the morning before breakfast.

In Yater's opinion in 1938 the level of the glucose in the blood rises after one-half hour to 150-160 mg. percent, but falls to its original, or even a lower level, within two to three hours after the meal.

Another statement by Duncan[8] in 1942 further confuses the issue. He says in his excellent book on Diseases of Metabolism that the value obtained on a specimen of blood taken two hours after a meal should not exceed 160 mg. per 100 cc, and if it does exceed 160 mg., it is good evidence that there is impairment of the carbohydrate tolerance, especially if there has been no previous restriction in diet, and the patient has had a meal containing 100 gm. of carbohydrate previous to this test.

It is realized that the quotations from these writers is rather old, and that their opinions may have changed since then, but they are only given to show the trend of thinking until the present day, and cast no personal reflection on the high character of these references.

Joslin, Root, White and Marble[9] in 1944 regarded a blood venous sugar of 0.17% following a meal as indicative of diabetes. There is a tendency today to regard a normal sugar three hours after a meal containing at least 100 gm. of carbohydrate as excluding diabetes mellitus. Many writers, including Harrison,[10] emphasize this fact.

Two methods of venous blood sugar are employed today. Some clinics have replaced the Folin-Wu method with the Somogyi method which eliminates reducing non glucose substances in the blood and gives the "true glucose value." In the "Diabetic Guide Book for the Physician," published in 1950, by the American Diabetes Association, the following definitions of diabetic diagnosis are established:

Folin-Wu Method—Over 130 fasting
Over 200 after eating
Somogyi-Method —Over 110 fasting
Over 150 after eating.

However, it is stated that blood sugar values below the above levels do not exclude diabetes. A diabetic may have normal blood sugar both before and after eating if diet has been restricted or insulin has been taken before the test. On the other hand, a non-diabetic person who has been starved may have temporary hyperglycemia and glycosuria when first fed. This emphasizes the fact that before a glucose tolerance or meal tolerance test, the diet should not be restricted for three days previous to the test, the carbohydrate being at least 300 gm. per diem, and that if the meal tolerance test is performed it should contain at least 100 gm. of carbohydrate.

Orent-Keiles and Hallman[12] gave volunteers eight different food combinations ranging from a cup of coffee to a breakfast containing 758 calories. They estimated the blood sugars post-cibally from one half to three hours at one-half hour intervals. The Folin micromethod was used, and the time was estimated from the time eating started. A standardization period of three weeks was insisted upon during which all the subjects ate the same meals. During this period the subjects became accustomed to the various procedures employed in the study.

Fifty-six blood sugars were taken after the various breakfasts. The maximum two hour rise in the whole series was up 23 mg. from a 79 mg. fasting 102 mg.). The maximum height at the two hour post-prandial level was over 120 mg. on only one occasion when it rose to 127 from a fasting of 111. The average rise in the fifty-six sugars at two hours after breakfast was 8 mg. above the fasting level.

Probably the pioneer work on fasting sugar versus post-prandial sugar was done by Sindoni[13]. Asserting the fact that the glucose tolerance test was an artificial strain on the carbohydrate regulating mechanism, he gave twenty normal people, from six to sixty-one years of age, a breakfast consisting of 32 gm. protein, 64 gm. of fat and 95.6 gm. of carbohydrate. There was no rise over the fasting blood sugar in two hours, most being slightly lower, the average decrease being 4.8 mg. un-

der the fasting. Approximately the same level was obtained at three and four hours post-prandially. Only at the one-half hour level was there a rise of an average of 0.8 mg.

TWO HOUR POST-PRANDIAL BLOOD SUGAR LEVELS

In recent years the post-prandial blood sugar has been steadily acquiring popularity. Some physicians are utilizing it almost in entirety and others are employing it in conjunction with the fasting method. Since controversy exists pertaining to the average range of normal, the authors undertook to examine the results of the post-prandial blood sugar determinations on file in the Medical Division of the E. I. duPont deNemours Company, Wilmington to ascertain information on "the probable normal."

The records of the Medical Division contained 255 reports between the years 1935 and 1950. These tests were done mainly for diagnostic purposes on apparently normal subjects undergoing annual physical examinations. Physical findings and routine laboratory studies were recorded on each employee.

The Folin-Wu intravenous blood sugar determination was performed on each individual two hours following a breakfast containing about 100 grams of carbohydrate derived from fruit juice, cereal, egg, bacon, toast, coffee, cream and sugar.

Ages in the group ranged from 18 to 65. The majority of the patients were in the middle age groups. All workers were employed in sedentary positions. The group was comprised of 183 males and 72 females.

Group I (ages 18 to 20) was represented by just two individuals of the male sex with an average probable normal of 98 mg. Group II (ages 21 to 30) consisted of 14 males and 13 females totaling 27 persons with an average probable normal of 96 mg. The lowest blood sugar was 69 mg. and the highest was 126 mg. In Group III (ages 31 to 40) there were 43 employees. Of these, 33 were male and 10 female. The average probable normal in this group was 114.6 mg. The lowest recorded value was 76 mg. and the highest was 200 mg. Group IV (ages 41 to 50) was by far the largest one. It was composed of 106 individuals. It consisted of 63 males and 43 females. The average probable normal was 108.6 mg. The low value was 69 mg. and the highest was 243 mg. Group V (ages 51 to 60) consisted of 60 males and 6 females totaling 66 persons. The average probable normal was 114.4 mg. The low determination was 76 mg. and the highest was 260 mg. Group VI (ages 61-65) consisted of 11 males. The average probable normal was 98.5 mg. The lowest recorded value was 67 mg. and the highest was 147 mg.

The average probable normal post-prandial blood sugar for the entire 255 persons was 104.8 mg.

Table I shows the results on ten suspected diabetic cases.

TABLE I

AGE	SEX	HEIGHT	WEIGHT	POST PRANDIAL BLOOD SUGAR 2 hrs. P-C	COMMENTS
41	F	68"	147	85	Carbuncles three times in past year. Paternal grandmother is diabetic.
42	M	71"	162	71	Glycosuria two years ago.
37	M	70"	139	104	Carbuncle on back of neck.
28	F	65"	126	107	Carbuncle on left buttock.
28	F	63"	147	107	Mother has diabetes.
22	F	63"	112	86	Father has diabetes.
24	F	65"	108	91	Fatigue.
48	F	64"	132	82	Mother has diabetes. Itching of hands.
63	F	63"	182	207	Obesity. Faint trace of sugar in urine. (Fasting Blood sugar —186).
60	M	71"	211	89	One recent urine showed one plus sugar.

DISCUSSION

A review of the literature on post-prandial blood sugar values seems to indicate a great deal of uncertainty as to the normal post-prandial values. Many writers and medical teachers still place the post-prandial value above normal fasting levels. This has been emphasized by the questioning of interns and residents, especially at the Philadelphia General Hospital, by Sindoni, Gerber and Bove[14]. The answers given by them are invariably higher than the fasting level, which must be the result of their teaching. Assuming that the post-prandial blood sugar is not above the normal at any time, it would seem that any post-prandial level above the normal fasting level justifies a glucose tolerance test. However, the post-prandial sugar may be used in many cases without employing the glucose tolerance test, especially where symptoms and

signs are suggestive of diabetes. Laboratory error excepted, a rise over 120 mg. per 100 cc. post-prandially demands further investigation.

CONCLUSIONS

1. An analysis of the post-prandial blood sugar at the two hour level on 245 apparently normal persons and 10 suspected diabetics was performed at the E. I. duPont deNemours Company at Wilmington.

The average probable normal was estimated to be 104.8 mg. per 100 cc. by the Folin-Wu method. Sugars were performed intravenously after a liberal breakfast containing 100 gm. of carbohydrate.

2. From a review of the literature on the subject, and this study, it is concluded that the normal post-prandial sugar at the two hour level is not above the normal accepted range of fasting (80-120 mg. per 100 cc.).

3. The post-prandial sugar may therefore be used at this level for diagnostic distinction between diabetics and non-diabetics. This has already been adopted by many clinics, including the clinic at St. Francis Hospital. Sindoni[15] also uses the post-prandial two hour level in treatment, estimating the normal for an adult diabetic taking insulin and free of diabetic symptoms as being between 170-220 mg. per 100 cc.

4. The post-prandial sugar is of especially good diagnostic value in routine practice because many diabetics run a normal fasting sugar.

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MESENTERIC VASCULAR OCCLUSION*

CHARLES J. DOUGHERTY, M. D.**
Wilmington, Del.

Mesenteric vascular occlusion as a clinical entity has received more consideration in the literature during the past several years than formerly. Much of the written material prior to twenty years ago dealt with postmortem findings, although cases of successful operation had been reported from time to time. In 1938, Whittaker and Pemberton reviewed their cases over a ten year period and found this condition to carry a grave prognosis. The operative mortality for this series was approximately 85%, and the non-operative 100%. This and similar reports have caused physicians and surgeons alike to give little thought to a successful termination of this abdominal catastrophe. Several reports have appeared recently wherein prompt operation with resection of the involved bowel has been followed by recovery. Indeed, Christensen, Musgrove and Wollaeger recently reported the case of a 64 year old man in which occlusion of the superior mesenteric artery had produced gangrene of most of the small bowel and the proximal half of the large bowel. Recovery followed extensive resection and anastomosis of the remaining two and a half feet of the jejunum to the left transverse colon. They conducted extensive postoperative studies and found no serious disturbances of nutrition. Fecal fat and nitrogen loss was found to be 20% of that ingested and indicated surprisingly little reduction of small bowel function, considering 60 to 70 per cent of the small bowel had been removed. This is evidence of the great reserve power of the small intestine or a great ability to compensate for the loss of the bowel resected. All of the occlusions of the mesenteric vessels are not as massive as this however, and the surgeon will not know in many cases what he is dealing

*Read before Staff Meeting, St. Francis Hospital, April 24, 1951.

**Associate in Surgery, St. Francis Hospital.

with until the abdomen is opened as an emergency procedure.

The occlusive process may involve an artery, a vein or both. The venous occlusion has been found to account for nearly half of the cases, the arterial about a third, and combined arterial and venous the remainder. If arterial, the superior mesenteric artery, less frequently the inferior mesenteric, or both are involved, and at times the occlusion can be confined to the smaller branches. The causes of arterial occlusion arise from embolism or thrombosis. The emboli usually originate from an auricular fibrillation or mural thrombus. The thrombi occur in association with such arterial diseases as thromboangitis obliterans, arteriosclerotic obliterans, periarteritis nodosa, and at the site of operative trauma. The venous occlusion can occur in the portal vein, the main trunks of the superior and inferior mesenteric veins or their branches, and of course, is always a thrombus. The causes of this type include a phlebitis following an intra-abdominal suppurative process such as a perforated appendicitis, stasis from a portal hypertension, various blood dyscrasias, splenic anemia, polycythemia vera, and pressure from various tumors, adhesions or congenital bands.

Trauma, particularly at the time of abdominal surgery not infrequently has been cited as a cause. Thrombosis of artery or vein follows surgery more frequently in patients predisposed to thrombus formation such as splenic anemia and arteriosclerosis. Some cases, such as those suffering from severe arteriosclerosis or advanced liver disease, are moribund at the time occlusion takes place. Occlusion of the inferior mesenteric artery rarely causes much devitalization of the left side of the colon because of the close collateral connection with the middle colic and hemorrhoidal arteries. It is possible to have some collateral circulation established in occlusions of the superior mesenteric artery also, inasmuch as this artery has some connections with the inferior mesenteric and gastric arteries. One case has been observed at autopsy in which the superior mesenteric artery was completely occluded with an organized clot, but the small bowel was normal and the collateral circulation traced to the above connections.

The amount of bowel involved may vary from a few inches of small bowel to the entire small bowel and the right half of the colon. As a rule the occlusion, whether arterial or venous, results in a hemorrhagic infarct, although some areas of ischemic infarction may be seen following the arterial occlusion. Gangrene, of course, closely follows. The onset of gangrene also depends on other factors. If the blood volume is lowered rapidly by a massive occlusion, gangrene will not have time to occur before death. When a shorter segment is involved, gangrene is more apt to be found and the wall of the bowel in this situation is excellent ground for bacterial invasion. Death here occurs from perforation and peritonitis, as well as toxemia.

The majority of the cases of this disease occur in men, as seen in Musgrove and Seybold's series, where 9 out of 13 were of the male sex. It may occur from childhood to old age, the most common age period being between 50 and 70 years, the time when degenerative diseases are apt to be present. From 1938 to 1948, 24 cases of proved mesenteric vascular occlusion were seen at the Mayo Clinic. Thirteen of these underwent operation, an operability rate of 54.1%. Of the 13 operated, 10 survived, a surgical mortality rate of 23%. Of the 11 patients not operated, 100% died. The overall mortality of these 24 cases was 68.9%. The operability, however, has increased since 1938 when it was reported from the same institution to be 31.6%. The reason for this increase in the number of patients operated for this disease is improvement in preoperative supportive therapy. In 1942, Laufman, Scheinberg and Shayel in an analysis of 44 cases over a ten year period, found this disease to comprise 0.105% of the 41,000 surgical admissions to the Michael Reese Hospital. In 68% of these, the condition was unsuspected until operation or autopsy. The preoperative diagnoses most commonly made were ruptured peptic ulcer, cholelithiasis, ruptured appendicitis, ureterolithiasis, and intestinal obstruction.

The symptoms vary considerably, depending on the amount of bowel undergoing infarction, the site of the occlusion, and to a lesser extent whether arterial or venous. There

are no distinct or pathognomonic symptoms or signs by which one may decide that the case at hand is an arterial or a venous process or that he is dealing with a mesenteric vascular occlusion at all. The most common and constant symptom is pain. This is a more or less generalized type, and is severe out of proportion to the abdominal physical findings. Definite localized tenderness may not be present over the area of the abdomen where the patient complains of pain. The next most common symptom is vomiting, but this is usually not severe, and fecal vomiting as seen in a mechanical obstruction usually occurs in the terminal stages.

Abdominal rigidity, as well as localized tenderness, will be present when the infarcted or gangrenous bowel produces irritation of the parietal peritoneum. This, however, is often not as marked as that seen associated with a purely inflammatory lesion of the abdomen. Diarrhea will sometimes occur, but constipation is seen more frequently. Bloody stools are present in about one quarter of the patients, usually late in the course of the disease, and are of some diagnostic significance. The temperature is usually found to be subnormal but late in the disease it may rise to 101-106 degrees, due to dehydration, peritonitis and toxemia. The pulse is usually rapid varying from 100 to 180 per minute, and may be weak in volume. The blood pressure is often found to be somewhat low, but usually it does not reach shock levels until late in the process unless the occlusion is massive. In the cases of Laufman et al., shock was present in 45.4% of the patients when admitted to the hospital. The presence of distention is seen late as a rule, and is more common in the venous type. The leucocyte count is elevated higher than is usually encountered in abdominal emergencies, varying from an average of 20,000 in the venous occlusion to an average of 27,000 in the arterial type, with a neutrophil response of over 80%.

Harrington has found that a plain x-ray of the abdomen may show the bowel distended down to the region of the splenic flexure, simulating a mechanical obstruction, and corresponding to the limit of distribution of the superior mesenteric vessels and their anastomoses. He then injects a small amount of barium into the bowel to prove that this is not a mechanical obstruction. The entire picture in some cases may resemble a true mechanical obstruction, but the pain overshadows vomiting, a reversal of the usual picture. Attempts have been made to differentiate an arterial from a venous occlusion clinically, but probably the most important difference will result from the fact that the changes in the bowel progress more slowly in the venous occlusions and the episode will appear to be less dramatic. The disease symptoms were found to be present from 18 hours to 3 days before admission to the hospital in Whittaker and Pemberton's series. Cases have been known, however, to have vague symptoms for as long as two weeks before the diagnosis was made at operation or autopsy.

The present case is another instance in which a mesenteric occlusive process produced gangrene of the bowel, with a successful termination of the case resulting after resection of the involved parts. In most series the diagnosis is rarely made preoperatively, and a mesenteric vascular occlusion is considered a possibility in only about 25% of the cases. In the present case the preoperative diagnosis was that of acute abdomen, probably a perforated appendicitis with a localized peritonitis.

CASE REPORT

History. The patient is a 30-year-old negro who was admitted to St. Francis Hospital on July 17, 1949. His chief complaint was pain in the lower right abdomen of 24 hours duration. For the three days prior to this the pain had been diffuse, noticed mostly around the umbilicus. It was at first of moderate severity and was accompanied by anorexia and nausea. A few episodes of vomiting occurred during the two days before admission. The pain did not seem severe enough at first to seek the advice of a physician, but in the 24 hours prior to admission, it had shifted to the right lower quadrant and was a constant steady type causing discomfort on movement in bed. The bowels were constipated since the onset, and there was no symptomatology referrable to the urinary tract. The review of the systems was negative except for the above symptoms. The past history revealed that the patient had been in excellent health during most of his life

time. He stated he had suffered from the common childhood diseases but had no sequelae. In 1944, he was hospitalized in an Army General Hospital for several months with the diagnosis of hepatitis, but recovery was said to have been uneventful. The patient did not know whether or not he had been jaundiced. No further history of illnesses, operations or injuries was elicited.

Examination. The patient was a young, rather slim male adult. He appeared to be in a good state of nutrition and was lying in bed in some degree of pain. The temperature was 98.4 degrees, Pulse 120, respirations 22 and blood pressure 100/60. No pathology was revealed in the head, eyes, ears, nose and throat. The heart and lungs were normal to auscultation and percussion. The abdomen appeared slightly distended and on palpation severe tenderness was present in the right lower quadrant and less marked on the left side of the lower abdomen. Rebound tenderness was elicited. A moderate amount of rigidity was present in the right rectus muscle. Peristalsis was present but diminished over the lower abdomen. Rectal examination revealed some mild tenderness on the right on high palpation. The extremeties were normal as were the tendon reflexes.

Laboratory Findings. Hemoglobin 85%, Red blood cells 4.0 million, white blood cells 20,500, Neutrophils 85%, Lymphocytes 15%. The number of segmenters and non-segmenters was not reported. Urine—specific gravity 1.021, albumin 3 plus, sugar negative, and the microscopic revealed red blood cells, granular casts and white blood cells. No other laboratory studies were considered necessary at the time, and the patient was prepared for laparotomy with the tentative diagnosis of perforated appendicitis with localized peritonitis.

Operation. The patient was given morphine sulphate gr. 1/6, atropine gr. 1/150 and the anesthetist administered a spinal anesthetic of 14 mgm. of pontocaine. An intravenous infusion of 5% glucose in normal saline was started, but while the abdomen was being prepared the patient ceased breathing and the pulse became imperceptible. The anesthetist used suction in the pharynx and by forced respiration revived the patient after several minutes. An intratracheal tube was inserted and it was decided to proceed with the operation under cyclopropane.

A right lower rectus incision was made, and on opening the peritoneum black bowel presented itself. A small amount of brown fluid was present in the peritoneal cavity, which was mopped up with a sponge. On exploration, it was determined that the pathology involved the terminal 6-7 cm. of the ileum and part of the cecum in a gangrenous process, with dark spotted areas on the proximal ascending colon. The mesentery of the ileum cephalad to the area of frank gangrene revealed several black areas each the size of a half-dollar for approximately 18 inches above the ileocecal valve. Because of these areas in the mesentery it was decided to remove this part of the bowel even though there was no frank area of infarction as in the terminal ileum and cecum. Therefore the ileum was divided at this point and the terminal part of the ileum just described was resected. The peritoneum in the lateral gutter was incised and the cecum mobilized with some little difficulty because of the slippery serosal surface which readily peeled off on handling. The ileocecal artery and some branches of the right colic were ligated and the ascending colon divided where the bowel appeared normal. The patient's pulse then was reported by the anesthetist to be 140, and as long as the offending pathology had been removed it was decided to terminate the operation. Accordingly, the ileum and ascending colon were brought out of the incision in the manner of a Mickulitz procedure and a temporary ileostomy established. A stomach tube was inserted and the patient placed under oxygen, with the administration intravenously of emergency blood and additional 5% glucose in normal saline.

The patient reacted fairly well in the immediate postoperative period, the blood pressure being maintained at 120/60, but the pulse rate remained between 125 and 130 per minute until the next day, when it returned to 100. The patient was given 900,000 units penicillin and 2 gm. streptomycin parenterally daily. The temperature rose to 102° rectally on the second and third postoperative days, then dropped to 100 rectally, and remained there for several days.

The Payr clamp on the ileum was removed on the third postoperative day and brown liquid feces was soon expelled and continued to do so. The clamp on the colon fell off on the fifth day and this part of the bowel seemed well anchored in the wound. Intravenous heparin in the dose of 50 mg. every 4 hours was started on the third postoperative day and continued for several days. Adequate fluid in the form of intravenous glucose, amino acids and saline was given to insure a urinary output of 1000 cc. daily, as well as compensate for the loss of fluid and chloride from the gastric suction and the ileostomy drainage. Supplementary vitamins were also added to the infusions, and on the fifth day the stomach tube was removed. No distention was noted during the post operative period. The patient was able to tolerate a non-residue diet and was carried on this, fortified with extra vitamins. The postoperative chemistries done on the third day showed the blood urea nitrogen to be 30 mg., the carbon dioxide combining power 51 volumes per cent, the plasma proteins 7.52 gm. and the blood chlorides 500 mgm. (normal 450-500 mgm.). The hemoglobin was found to be 34%, and several blood transfusions were given to correct this.

Pathology Report. Gross. Forty-four cm. of terminal ileum, the appendix, and cecum. The mesentery of the ileum is blood red in color. The intestine shows little discoloration except at the ileo-cecal region where it is dark red. Tearing away the tissue of the mesentery indicates hemorrhage into the fat and connective tissue but no definitely thrombosed vessel is found.

Microscopic. The mesentery is diffusely infiltrated with blood and the blood within the larger vessels is clotted in layers as would be found in thrombosis although no adherent thrombus is included in the sections studied.

Diagnosis. Consistent with mesenteric thrombosis.

The patient took his diet quite well which was fortified with extra chloride and vitamins and was out of bed with a bag for his ileostomy. On the seventeenth postoperative day he developed a temperature of 103° with a feeble rapid pulse and low urinary output. It was decided the extra salt in his diet was inadequate and the syndrome was due to the fact that he was losing larger amounts of sodium chloride, bicarbonates, and fluid from the ileostomy than were being replaced by mouth. Immediate blood chemistries were obtained which revealed the blood urea nitrogen to be 65 mg., the carbon dioxide combining power 39 volumes per cent, and the blood chloride 400 mg. The patient then received parenteral sodium chloride, glucose and protein with 10 gm. of sodium chloride by mouth, exclusive of the sodium chloride in his diet. In a few days his carbon dioxide combining power, chlorides and urea returned to normal and he was maintained on this regime for the next month.

When it was decided the patient was ready for another operative procedure, he was given the bowel preparation with sulfasuxidine by mouth as had been recommended by Poth. At this operation the portion of the ileum and colon that was above the skin level was amputated and an extraperitoneal ileo-colic end-to-end anastomosis was done. The patient had a normal convalescence from this operation and was passing gas by rectum on the second postoperative day. On the fourth day he had a liquid brown stool, and continued to have one or two formed stools thereafter. He was discharged to his home at about his normal weight and state of nutrition. It was possible to follow him for six months after discharge from the hospital and he was then in a good state of health without any more such episodes.

COMMENT

This patient presented a symptomatology that resembled in most respects what is often seen in acute appendicitis. His pain, although severe on admission, was mild at the onset. The process was a progressive one ending with parietal peritoneal irritation and did not present the picture of sudden severe abdominal pain with shock and collapse as one would see in a complete occlusion of a large mesenteric vessel with extensive devitalization of bowel. The pain at first was a referred type being diffuse throughout the abdomen. Nausea was present but vomiting was not severe and the patient himself, although confined to bed, did not feel the need for a physician until the day of admission when the abdominal pain became more severe. The laboratory studies showed a severe infectious process as evidenc-

ed by the high white count, and the urinary findings may be interpreted as the reaction of the kidneys to the toxemia. Serum amylase studies were not done prior to the emergency laparotomy because the site of the tenderness and rigidity did not seem to indicate an acute pancreatitis. Mesenteric occlusion along with a volvulus of the cecum or small bowel could have been considered preoperatively as possibilities, as well as a perforated Meckel's diverticulum, but one is more prone to think of the simpler and more common diseases when confronted with an acute abdomen. The patient was younger than cases of this disease are likely to occur, but as has been previously stated, it can occur at any age.

The reaction of the patient on the table indicates that the general physical condition of these patients is not good, and the longer the process is allowed to go on the worse the prognosis. I have no doubt that the total blood volume of this patient was reduced preoperatively, but in the absence of clinical dehydration and in the presence of intraperitoneal disease as evidenced by physical examination and laboratory findings, operation could not be postponed for 24 hours or so to replenish fluid which this patient needed. Therefore it was decided to start fluid replacement at the operating table and proceed with the operation. I have no doubt that this factor plus the general toxicity of the occlusive process which notoriously lowers the patient's resistance to any procedure, was responsible for the near fatal reaction of the patient to spinal anesthesia. The ileoestomy, of course, was established because of the poor condition of the patient on the table, and time taken to do an anastomosis after resection might well have resulted in a fatality instead of ending the operation with a living patient.

The reaction of the pabtient to his ileostomy presented some interesting observations. Often patients in poor general condition such as this man, or those suffering from a debilitating disease such as chronic ulcerative colitis where ileostomy must be established, have a stormy time following this procedure. Indeed, the mortality rate in some clinics for ileostomy in the presence of chronic ulcerative colitis has been 15 to 20%. This is a situation where proper adjustment of the blood chemistry is the prime factor for survival of the patient. It is difficult to estimate how much fluid is lost from an ileostomy, inasmuch as one of the main functions of the large bowel is to extract fluid and render the feces in a solid form. When the fecal content is evacuated before reaching the large bowel the intestinal contents are lost in an almost continuous rate and do so whenever a peristaltic wave passes through to the ileum. Interestingly, after about a month this patient had semiformed stools, which shows that the ileum can develop in time some of the functions normally carried out by the colon. Then, besides the fluid loss, chlorides and bicarbonates are lost in fairly large amounts.

In this case, progress was satisfactory in the first two weeks after operation. There were very hot summer days at that time, however, and with the additional loss of chlorides in excessive amounts through perspiration, this patient developed a hypochloremic and acidotic state with a resulting uremia and oliguria. This was easily diagnosed clinically and proven by the blood urea nitrogen 65 mg., carbon dioxide combining power 39 volumes percent and blood chlorides 400 mgm. The treatment here is to restore fluids, supply adequate chlorides in the form of sodium chloride as well as glucose. Serum potassium studies were not done inasmuch as this deficiency was only being spoken of experimentally at that time. Probably a hypokaliemia would have been found if such studies were done, but suffice it to say, the patient responded rapidly without additional potassium except that obtained in the diet.

Gangrenous bowel, although in this case not as extensive as that reported by Christensen et al., is incompatible with life, and removal of the diseased part is imperative. Warren and Eberhard found in their analysis of 73 cases over a 20-year period that if resection of the involved bowel is done at the onset of the acute symptoms, the prognosis is fairly good, but after 24 hours the outlook is poor, and perforation and toxemia will result in a mortality. In this case the patient's symptoms were four days in duration, but fortunately the area involved was not great and the thrombosis was a slowly progressive one. The resection was done widely on either side of the area of infarction in the present case, which agrees with the idea of Brown, who

advocates resection of 3-6 inches on either side to prevent extension of the thrombosis. It was found in the studies of Whittaker and Pemberton that the venous thrombosis may start in the finer radicles adjacent to the bowel, or may originate in the portal vein, but progression of the thrombosis is the rule in either the ascending or descending types. They also found that the vascular changes in the bowel were not as rapid following venous thrombosis as that of arterial occlusion. Douglas found that in 4 of his 11 cases the pathologist reported that although there was gross damage to the bowel wall no gross thrombosis or embolism was found in the larger vessels. This suggested to him that in some cases the infarction began in the smaller vessels, either close to or in the vessel wall, and perhaps originating in the intestine itself. In the present case, although the pathologist did not find a definite thrombus in one of the larger vessels, the pattern of the blood is certainly that of prolonged stasis as is seen in vessels distal to the site of a thrombosis. There seems little doubt that from the clinical and pathological findings this process was a selective type of mesenteric thrombosis involving the ileocecal vessels and some of the branches of the right colic, and spreading to the intestinal branches adjacent to the terminal ileum.

Inasmuch as no proof exists as to the etiology of this occlusion, only speculation can be indulged in as to what caused this process. Periarteritis nodosa in a man of this age is a possibility, but absence of any such lesions in the mesentery tend to rule this out. However, one could theorize that the preoperative urine which showed albumin, casts, and blood cells might indicate such a process also present in the kidney. The urine became negative postoperatively, and although periarteritis involving the kidney presents transient urinary findings, one would expect the lesion to be present in the near proximity of the diseased bowel. Probably the most plausible explanation is that with the history of a hepatitis, the occlusion of the ileocecal vein, as well as those adjacent, was due to a slowly progressing thrombosis from stasis of an early portal hypertension as an aftermath of the liver disease. Liver studies were planned after the patient left the hospital, but the patient was reluctant to have these done.

CONCLUSION

A case of mesenteric vascular occlusion, probably a venous thrombosis, producing gangrene of the terminal ileum and cecum, with resection of the involved elements and the establishment of a temporary ileostomy as a life-saving procedure is presented. After reestablishing the intestinal continuity in a second operation, the patient had a successful conclusion to this often fatal disease.

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Travelers Aid

In April, 1925, the now famous "Blue Lamp" was instituted as the symbol of Travelers Aid in railroad stations. And this year, 1951, is the 100th Anniversary of the founding of the organization. All during this year, the 109 Travelers Aid Societies throughout the country will be commemorating the centennial of the half-million dollar bequest left in 1851 by Bryan Mullanphy, Mayor of St. Louis, to help the needy travelers passing through his city to the West. Travelers Aid has always regarded Mayor Mullanphy as traditional great grandfather, since he was the first person to provide funds to support the belief that the person away from home and in difficulty, is a separate and distinct social problem, as contrasted with that of the needy resident of a community. Travelers Aid is now a Red Feather service. Note: June 15 is the anniversary of Mayor Mullanphy's death, and it will be marked by special ceremonies in St. Louis. For full details on the centennial, call or write Mrs. Marguerite Dixon, National Travelers Aid Association, 425 Fourth Avenue, New York 16, N. Y., LE 2-9585. (National Travelers Aid is a member of the United Defense Fund).

New Plan To Aid Medical Schools

A unique philanthropic organization to provide financial assistance for all the nation's hard-pressed medical schools was launched in New York on May 16, 1951.

The undertaking has the sponsorship of industry, the medical profession, organized labor, agriculture, a group of university presidents, and 12 scientific and educational foundations.

The establishment of the National Fund for Medical Education was announced at the annual meeting of the sponsoring group at the Biltmore by former President Herbert Hoover, the Honorary Chairman of the Fund and S. Sloan Colt, Fund President and President of Bankers Trust Company, New York.

At the meeting it was also announced that the American Medical Education Foundation, founded last December by the American Medical Association in Cleveland, will funnel its contributions from doctors through the National Fund organization. The National Fund plans to make these and other grants available immediately to the nation's medical schools, many of which have large deficits.

In announcing the new Fund, Mr. Colt told the meeting its launching culminates two years of planning and organization. He further made known that initial support had come from a wide spectrum of the American community including contributions from the medical profession and such other groups as 18 leading life insurance companies and many industrial corporations. To date, these contributions provide the National Fund with starting resources of more than $1,000,000, toward a $5,000,000 goal for the first year.

Mr. Colt told the meeting that the chief objective of the National Fund is to seek voluntary contributions in order to relieve the acute problem faced by medical schools in endeavoring to maintain high academic standards in the face of crippling budgetary problems.

Mr. Colt said that the Fund trustees had set up appropriate machinery for distributing the money among the nation's medical schools. In developing this machinery, the Trustees were guided by their Advisory Council, which includes university presidents, representatives of the American Medical Association, the Association of American Medical Colleges, and the medical directors of several leading philanthropic foundations.

The Fund, Mr. Colt explained, has as its objective to turn over about $5,000,000 this year to the four-year medical schools and the approved two-year schools in the United States. It is hoped that in future years this figure can be raised substantially as the base of support is broadened nationally.

"This sum will not completely solve the distressing financial problem of American medical education," Mr. Colt said, "but it represents an important voluntary effort to help relieve the acute problem of the medical schools."

General Eisenhower, Mr. Colt explained in telling of the organization of the Fund in 1949, had issued the invitations to those invited as trustees.

"What is most gratifying and significant," Mr. Colt said, "is the fact that this vital project has brought together as trustees a broadly representative group of men and women. Those who organized the Fund may have differing social viewpoints but, insofar as the Fund is concerned, we have united in an endeavor to solve a serious problem for the common good. Unless the medical schools are given financial help, and given it quickly, the standards of medicine may be permanently impaired and the nation's health affected adversely."

Mr. Colt further said, "The Fund is a fine example of practical democracy at work and, for these reasons, it seems hardly necessary for me to mention that it is a nonpartisan body, not permitted by the terms of its charter to seek to influence legislation."

Mr. Colt pointed out that a novel feature of the Fund's machinery makes it possible for every dollar in contributions to flow directly into medical education. Such an arrangement is possible because the administrative costs of the Fund have been underwritten by the following organizations: American Medical Association, The George F. Baker Trust, The Carnegie Corporation of New York, The Commonwealth Fund, Albert and Mary Lasker Foundation, Lilly Endowment, Inc., Josiah Macy, Jr. Foundation, The John and Mary R. Markle Foundation, The Davella Mills Foundation, New York Foundation, Sarah Mellon Scaife Foundation and The Rockefeller Foundation.

+ Editorials +

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W. EDWIN BIRD, M. D. ——— Editor
822 North American Building

ANDREW M. GEHRET, M.D. ——— Associate Editor
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M. A. TARUMIANZ, M. D. ——— Assoc. & Managing Editor
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WANTED—THREE PAPERS

The scientific program for our Annual Session in Wilmington, October 8-10, 1951, is rapidly taking shape, but we still need three papers from Delaware Doctors. Our March Editorial asking for local volunteers brought in some replies, but not enough. Your officers will be very happy if just one physician from each of our three counties will notify this office immediately "that you can count on me"!

HEALTH OFFICERS CORRECT ON E. M. I. C. MATTER

The Executive Committee of the Association of State and Territorial Health Officers met recently in Washington to discuss with representatives of the Children's Bureau, at their request, the question of a program to provide some form of medical care for servicemen's dependents. The committee adopted the following statement:

In the preliminary discussions of the conference, representatives of the Children's Bureau presented factors which suggested growing possibility of introduction of legislation of this type. After review of this information and other information available, the committee determined that there is not sufficient evidence of need to justify the support, promotion or introduction of such legislation at this time.

However, because of the difficulties and strained relations incurred by the establishment and administration of the E. M. I. C. (Emergency Maternity and Infant Care) program during World War II, the committee agreed to review the possible policies and procedures of administration which would be required in such a program if legislation of this nature is introduced, considered, or passed.

The committee does not favor the reactivation of the E. M. I. C. program at this time. It wishes to record its position as not promoting, supporting or seeking legislation to that end. The committee is prepared at any time to review its decisions should additional information be presented to it for further consideration.

In our opinion the attitude by the health officers' organization is sound. Until plenty of folks in Washington make up their minds about a lot of things, we are heartily in favor or keeping new programs and activities in moth balls. Also, if and when it becomes necessary to revive E. M. I. C. it should be generally overhauled. It had too many bugs in it before. Editorial *Ohio S. M. J.*, May,1951.

National Doctors Committee

Dr. Robert Collier Page, Chairman of the National Doctors Committee for Improved Federal Medical Services, recently announced the completion of an advisory committee of experts from every branch of the medical profession. They will consult with the Chairman on matters of policy in the pending campaign to secure wide economies and more efficiency in the present overlapping and competing system of hospital and medical care operated by the government. Dr. Page, who is Medical Director of Standard Oil Company (New Jersey), also announced that his general committee will carry on an educational program for the benefit of 178,000 doctors. He said that this project is rapidly growing.

The National Doctors Committee is an affiliate of the Citizens Committee for the Hoover Report, which is urging passage of the recommendations of the bipartisan Hoover Commission for the unification of the various governmental medical agencies under a single authority. The slogan of the Doctors Committee is "Not more government in medicine but better medicine in government."

"The interest in our general committee is surprisingly large, and very widespread," Dr. Page said. "I think every state in the nation will have a good representation of medical men. Doctors, perhaps more than any others, are aware that the existing competition for medical and technical manpower by the several federal hospital systems is depriving the general public of certain services to which they are entitled. They realize that this waste must be eliminated for the benefit of all our people."

The advisory committee has been formed to include high-ranking men in the 20 major divisions of medicine and surgery and the allied technical skills, as follows:

Anesthesiology: Charles Fletcher McCuskey, M. D., Los Angeles, California; Dermatology and Syphilology: Donald M. Pillsbury, M. D., Philadelphia, Pennsylvania; General Practice: Samuel Arthur Garlan, M. D., New York, N. Y. and Rufus B. Robins, M. D., Camden, Arkansas; Internal Medicine: Maxwell Myer Wintrobe, M. D., Salt Lake City, Utah; Cardiology: George Edward Burch, M. D., New Orleans, Louisiana; Medical Education: Richard Hale Young, M. D., Chicago, Illinois; Neurological Surgery: Howard Clifton Naffziger, M. D., San Francisco, California; Obstetrics and Gynecology: Charles Denton Kerr, M. D., Houston, Texas; Ophthalmology: Donald Marshall, M. D., Kalamazoo, Michigan; Orthopedic Surgery: Lewis M. Overton, M. D., Albuquerque, New Mexico; Otolaryngology: Clair Michael Kos, M. D., Iowa City, Iowa.

Also, Pathology: Thomas Byrd Magath, M. D., Rochester, Minnesota; Pediatries: Lee Palmer, M. D., Louisville, Kentucky; Physical Medicine: George D. Wilson, M. D., Asheville, North Carolina; Plastic Surgery: James Barrett Brown, M. D., St. Louis, Missouri; Preventive Medicine and Public Health: Brig. Gen. James Stevens Simmons, M. C., Boston, Massachusetts; Psychiatry and Neurology: Herbert Spencer Ripley, M. D., Seattle, Washington; Radiology: Arthur Bradley Soule, Jr., M. D., Burlington, Vermont; Surgery: Richard Kennedy Gilchrist, M. D., Chicago, Illinois; Thoracic Surgery: Henry Swan, M. D., Denver, Colorado; Urology: Charles Rieser, M. D., Atlanta, Georgia.

OBITUARY

I. WALLACE MAYERBERG, M. D.

Dr. Mayerberg, one of three physician brothers, died on May 2, 1951 at his home. He had been ill two years. He retired from the DuPont Company in December, 1949.

Dr. Mayerberg was born in Statesville, N. C., a son of Julius L. and Rachael Mayerberg.

A graduate of the University of North Carolina, Dr. Mayerberg took his medical degree at Jefferson Medical College, Philadelphia, in 1907. He interned at the Norristown General Hospital, Norristown, Pa., for one year.

He then went to Selma, N. C., where he practiced general medicine for 23 years. Dr. Mayerberg took special work in diseases of the eye, ear, nose and throat at the Polyclinic Hospital, New York City, for two years. He practiced his specialty in Dover for ten years, then went with the medical department of the DuPont Company.

Dr. Mayerberg was a former member of the New Castle County Medical Society, the Medical Society of Delaware and the American Medical Association. He was a member of the Wilmington Kiwanis Club; a past president of the Dover Kiwanis Club and a past president of the Selma, N. C., Kiwanis Club. He was also a 32nd degree Mason.

Surviving him are his wife, Mrs. Florence Maude Mayerberg; one son, Wilson Lewis Mayerberg of Teaneck, N. J.; a grandson, Willson Lewis Mayerberg, Jr.; and two brothers, Dr. Emil R. Mayerberg, Wilmington, and Dr. Samuel S. Mayerberg of Kansas City, Mo.

The funeral took place from the Yeatman Funeral Home on May 4, 1951, the Rev. Donald H. Douds, pastor of Hanover Presbyterian Church, officiating. Interment was at Highspire, Pa., on May 5, 1951.

BOOK REVIEWS

Functional Anatomy of the Limbs and Back. By W. Henry Hollinshead, Ph. D. Pp. 341, illustrated. Cloth, $6.00. Philadelphia: W. B. Saunders Company, 1951.

Although the title is limited to the Limbs and Back, actually the entire body is covered in the text. The contents are divided into five sections as follows: (1) The Organization of the Body; (2) The Upper Limb; (3) The Back; (4) The Lower Limb; (5) The Head, Neck and Trunk.

The text is well illustrated with anatomical drawings which show clearly the functions of muscles and the movements of the body.

This book is intended for the non-medical student of muscular movement, but the subject is so clearly presented that physiotherapists, occupational therapists, physical educators and physicians who treat poliomyelitis should find it very instructive. It forms a good basis for the study of the fundamental movements of the body through the proper understanding of the morphological basis underlying function of muscles.

It is also going to fill the gap, thus far not emphasized, in the diagnosis and management of neuromuscular conditions, including poliomyelitis. The general practitioner interested in these diseases should get well acquainted with the "Functional Anatomy of the Limbs and Back."

Physiology of the Eye, Clinical Application. By Francis Reed Adler, M. D., Professor of Ophthalmology, University of Pennsylvania, and Consulting Surgeon, Wills Hospital, Philadelphia. Pp. 709, with 319 illustrations, including 2 in color. Cloth, $12.00. St. Louis: C. V. Mosby Company, 1950.

We are now enjoying an era in medicine in which the application of physiology to the study of disease is a fundamental requirement. Thus, "The Physiology of the Eye" offers to the practicing ophthalmologist, as well as the general practitioner, and to the student, the recent findings which can be applied clinically.

The contents of the book are divided into twenty-two chapters. Each subject is discussed in detail in an easily read and understood language, which is a departure of the highly scientific terminology one expects to find in a book of this nature. The interest of the reader is maintained to the end of each chapter because of the practical correlation of the physiology of the part discussed to the clinical application. This has made it necessary for some of the chapters to be more lengthy than usual.

Some of the interesting phenomena discussed with each part of the ocular system are the metabolism, the nutrition, the chemistry, and the method of excretion of the metabolites. Chapter X on Ocular Motility will be found very informative inasmuch as it describes the gross anatomy and action of each ocular muscle and the mechanics involved in the various operative techniques for strabismus.

A complete bibliography is given at the end of each chapter for those interested in research references.

Physiology of the Eye is highly recommended for the general practitioner as well as for the eye specialist.

The Science of Health. By Florence L. Meredith, M. D., Second Edition. Pp. 452, Cloth, $3.75. Philadelphia: Blackiston Company, 1951.

This is a comprehensive book on personal and public hygiene, with the various systems of the human body analyzed in a language that can be understood by the lay student who is attempting to learn the structure and function of the human body. The emphasis is placed on the maintenance of personal, physical and mental health, and in order to accomplish this a basic knowledge of the anatomy, physiology and chemistry of the human body is discussed.

The contents of the book are divided into five parts: (1) Introduction; (2) Daily maintenance of Health; (3) Major Health Problems in the United States; (4) Mental Health; (5) The Next Generation.

This is an excellent text book for hygiene courses for college students, nurses, and sociologists.

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1. Tuft, L.: Clinical Allergy. Philadelphia, W. B. Saunders Co., 1947, pp. 335-336.
2. Hansel, F. K.: Allergy of the Nose and Paranasal Sinuses. St. Louis, C. V. Mosby Co., 1936, p. 769.
3. Kelley, S. F.: Choice of Sympathomimetic Amines. Cornell Conferences on Therapy, II, 1947, p. 156.

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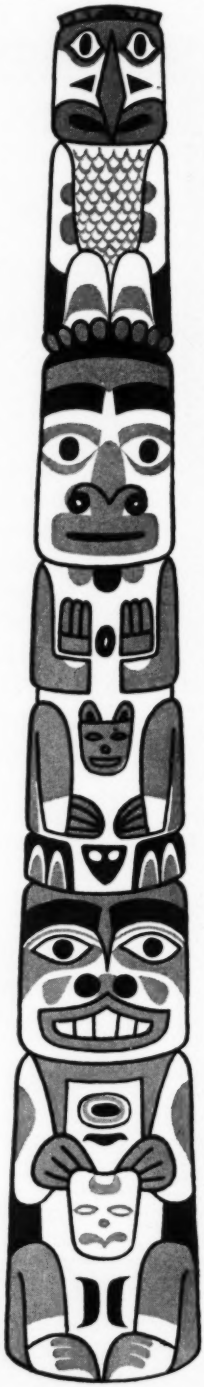

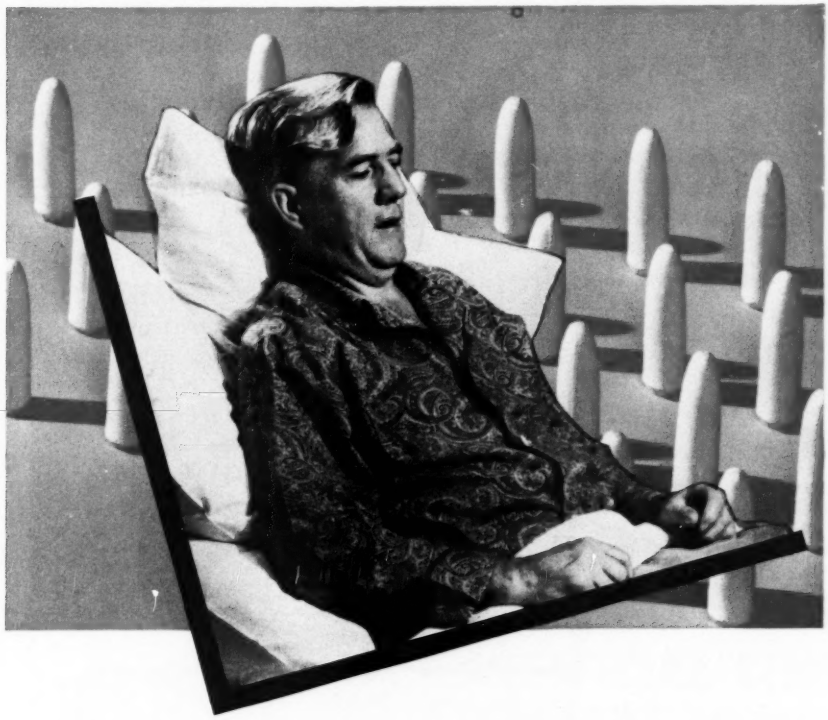

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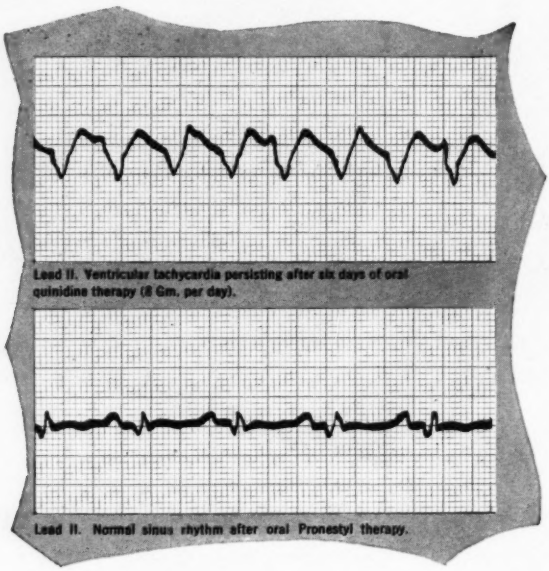

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